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THE MARCH OF EVENTS

WHEN THE CONSUL Octavian returned to Rome after the defeat of Antony in Egypt he was hailed by the Romans with tremendous enthusiasm because they believed that a century of strife and civil war had ended and they looked forward to an era of peace and prosperity. But Octavian did not immediately become Emperor; he handed back his powers to the Senate, but they returned them to him, with the title of "Augustus" and "Imperator," and thus gradually an Emperor was created to rule an empire. The Romans wanted the peace and prosperity which they thought Octavian could give them, and, therefore, he became chief ruler because the circumstances created a demand for him. Two centuries of peace followed.

It is only an incident in ancient history, but it may be recalled to-day when these New United States find themselves forced by circumstances into the position of the chief nation of the world. Our nation did not set out deliberately to achieve this powerful position; it was accident from beginning to end. As the world entered the machine age our race spread over a part of the North American continent which was especially rich in the elements of machines. About the same time a political philosophy not entirely new in the world found embodiment in a government which, combined with the richness of the natural resources of the land, attracted from other lands the adventurous and the oppressed who sought freedom and riches. The two combined in the making of a great nation—a nation rich in both the material and the spiritual side.

Powerful as this nation became before the last war, it refrained from aggression or participation in the quarrels of others, but made its chief policy the protection and the integrity of its own territories and those of its weaker neighbors. The cry of imperialism frequently was raised by nations more open to the charge themselves, and in our youthful self-consciousness we failed to look for the motives behind the cry and always placed too much importance upon it. In our shyness of the world we shrank from taking a strong part in the world's affairs, though our own growth gradually thrust more and more responsibility upon us.

That era now is past. We have shrunk long enough from the world. We have not gone to the world, but the world has come to us. Though we occupy only a fraction of the land surface of the globe we supply more than half of the earth's most important products. The world had to come to us for these products and the

accident of war created so great a demand that the financial leadership of the world was placed on our doorstep—a leadership we might not have won by years of deliberate and constant endeavor if the war had not come.

So, without plan or policy, we have arrived before our time at the point of leadership—with the minds of our people shackled by century-old prejudices and traditions. With the world's gold in our coffers we owe other nations as much as we owe ourselves—we owe them a custodianship of this power which will benefit them economically, and by benefiting them we benefit ourselves, for we still have half the world's products to sell, and nations sound and stable financially can buy them in ratio to their stability. Our industries are stretching out their hands for foreign markets, and they must have the outlet if we are to retain and extend our prosperity; we need particularly an outlet for our agricultural surplus. We can find and hold those markets only if we take our full part—and more—in world affairs. We cannot be only a trading nation and forget the social amenities or withold the hand or purse to nations in distress. That would lay us more and more open to the charge that we are materialistic.

But it is materialism which has brought us the leadership: we had the resources and other nations gave us the money for them. If we are to play a strong part in bringing about an era of world peace and prosperity we must use the forces which events have handed us—the resources of our lands, the gold from other nations—all administered without fear and with the thought in mind that if we are sincere in our hopes of doing good for other nations we can render ourselves and other nations a service only by playing a full part with the resources at our disposal. If we play this part we may insure a peaceful era; if we do not we shall become weak materially and morally, and over the riches of a nation which failed to fulfill its trusteeship will begin a squabble in which that nation itself inevitably would be involved and destroyed.

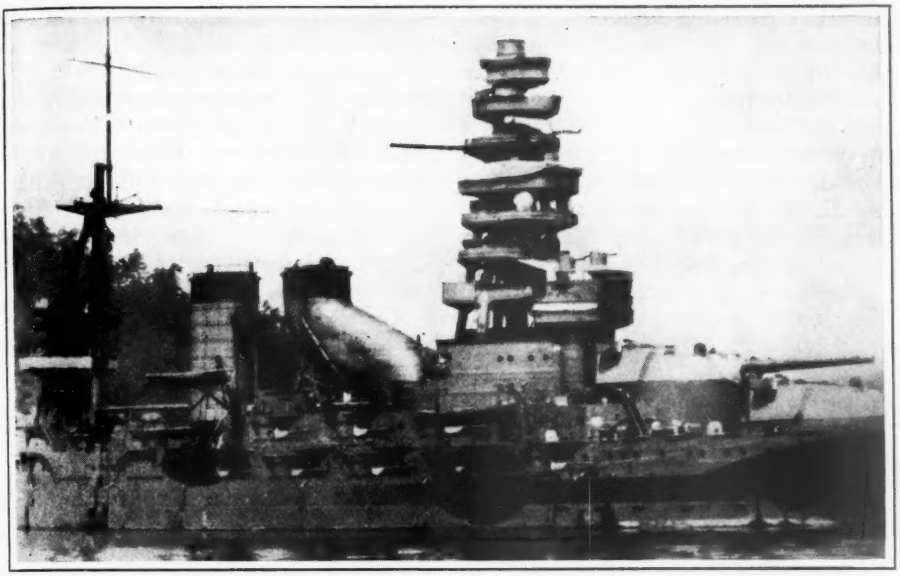
The State Of National Defense

THE ANNUAL REPORTS of the Secretaries of War and Navy, accompanied by those of their principal subordinates, while pointing out some accomplishments, are in general a record of existing deficiencies. Though only guarded reference is made, it is easily seen that lack of funds is the sole cause for the failure of both services to reach the standards of efficiency which they consider essential.

Were it not for three standards definitely

H. M. S. HOOD, PRIDE OF THE BRITISH NAVY

The majesty of the Atlantic fleet was displayed in war maneuvers staged off Portsmouth, England, for the Dominion premiers attending the recent London conference.



THE LATEST IN WARSHIP DESIGN

The Japanese battleship *Mutsu*, said to have cost $40,000,000. Note the new type of fighting top, with guns on the upper levels.

established by Congressional action, there might be doubt in some quarters as to whether or not the services are not inclined to overestimate their needs in view of the present-day situation of the country in world affairs. The National Defense Act of 1920, our first and only military policy; the 5-5-3 ratio established by the Washington Arms Conference Treaties; and the five-year aviation program authorized by Congress as the result of the Mitchell affair, all came into existence after prolonged public discussion participated in by as many, if not more, civilians than military people.

In general, the Army is far below the standards set by the National Defense Act. It is evident that this is not because of difficulty in getting men to enter the Regular Army, the National Guard, and the Organized Reserve, and boys to enter the Reserve Officers' Training Corps and go to the Citizens Military Training Camps. It is solely because the money is lacking to provide for anything like the numbers who wish to do so.

The Navy, because of our own failure to maintain what we had and because of the building programs of other navies, is inferior in strength to that of Great Britain and considerably below the ratio of 5 to 3 with respect to Japan's navy. In general, the reports indicate that the Navy is primarily concerned with trying to keep its strength from still further falling off. Apparently, it has given up hope of occupying the position accorded us by the Washington Arms Conference Treaties.

Neither in the Army nor in the Navy has anything been done to carry out the first of the five yearly increments authorized by Congress in its five-year air program. It was contemplated that the first of these increments should have been completed by the end of the fiscal year 1927, that is, June 30, 1927. As no funds were made available for this purpose, nothing has been done. The present session of Congress will provide funds for the fiscal year 1928, which begins July 1, 1927. Therefore, the air program is already at least one year behind. The question which is bothering both services is the intent of the Administration, as demonstrated by the budget just sent to Congress, to force them to absorb the first of the aviation increases,

instead of providing additional funds for that purpose. The Army report refers to this directly in stating that it cannot be done "without the automatic creation of vital basic deficiencies in other elements of the military establishment." In the Navy reports, the same point is indirectly brought out by showing the present tendency of the Navy toward vital basic deficiencies, due to lack of funds.

The findings of both the Morrow Board appointed by the President to investigate aviation and the Congressional investigating committee resulting from Colonel Mitchell's charges, can be summed up in two sentences. *First*, we need greatly to increase our aviation. *Second*, aviation cannot replace any land or sea armament, but must be had in addition to the existing means of waging combat on both these elements.

A comparison of the conditions as shown by the annual reports with the state of affairs which would obtain had the three standards set by Congress been adhered to, gives an excellent example of the fact that Congressional authorization of a project gives no guarantee of its being carried out. These three projects have lagged for but one reason—the failure of the executive branch of the government to ask for the necessary funds.

There can be no doubt that the country as a whole has been lulled into a false sense of security because it believed that the National Defense Act provided an adequate Army, that the 5-5-3 ratio made our Navy equal to that of Britain and superior to that of Japan, and that the five-year aviation program remedied our defects in the air, over both land and sea. Paraphrasing the last sentence of Secretary Davis's report, we should not blindly delude ourselves into the belief that plans on paper are accomplished things.

Paper Cruisers

UNDER the agreement reached by the Washington Arms Conference, the United States was to have the right to maintain an equality of status in capital ships with Great Britain and a ratio of 5 to 3 with Japan. We have not maintained the strength in capital ships to which we were entitled under the agreement, nor have we built cruisers. Great Britain now has 54 cruisers built or appropriated for, Japan 25, and the United States 15—or, reducing the number of cruisers to approximate fractions, the ratio is Great Britain 5, Japan 2, United States $1\frac{1}{2}$. Thus it is seen that we have gone far in the direction of removing the American flag from the seas.

The President's budget message proposed the appropriation of money by Congress for three new cruisers, but late last year the House Naval Committee demanded a program of ten additional cruisers which, with eight previously authorized in 1924, would total eighteen. But they are "paper cruisers" and cannot and will not be built until the money is appropriated by Congress.

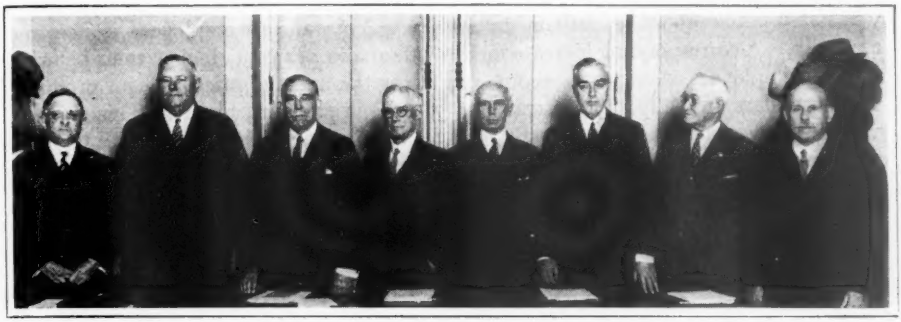
Our national tradition is against both imperialism and aggression, and, therefore, no nation could justly suspect us of improper motives if we took our cruisers off paper and put them on the seas. In time of necessity cruisers in the water carrying guns, powder, and American bluejackets will be of much greater use than cruisers on paper in the files of the War Department. This nation will not be taken seriously on the water or on paper unless we have something tangible to trade and to talk about. In our mania for governmental economy this nation cannot afford to be ruinously stingy with our national defenses.

Higher Wages for Railway Workers

THIS NATION has been ringing with a song of prosperity for four years, but the voice of the farmers has made a discord. Some farmers have done well, but farming generally, especially in the West, has been rewarded with smaller incomes than many other kinds of endeavor. There have been different causes—war-time land speculation, for example—but the main cause has been that, because of changed relations between prices, a bushel or a ton of most

kinds of farm products will not buy as much of many other commodities now as before the war.

The recent award of a $7\frac{1}{2}$ per cent. advance in wages to the conductors and trainmen of the eastern railways may seem to have no bearing on the farm situation. But wages are a large part of the cost of transportation. The wages paid by railways partly determine the wages paid in other industries. Agriculture must bear its share of the effect produced upon freight rates and commodity prices by the wages paid in industry.



THEY AWARDED HIGHER WAGES TO RAILWAY TRAINMEN

The members of the Railway Board of Arbitration were (left to right): D. L. Cease; E. P. Curtis; W. D. Baldwin; E. C. Clark, chairman; W. A. Baldwin; R. V. Massey; W. G. Lee, president of Brotherhood of Railway Trainmen; and L. E. Sheppard, president of Order of Railway Conductors.

The Transportation Act of 1920 created a Labor Board to fix railway wages, although it could not enforce its awards. It granted an advance in 1920 which made wages the highest in history. It granted reductions in 1921 and 1922, but left them higher than in any year prior to 1920. Its decisions caused dissatisfaction among employees, and led to the great shop employees' strike of 1922. A majority of railway executives in 1925 joined with the leaders of the labor unions in securing the passage of the Watson-Parker Railways Labor Act. This abolished the Labor Board, created a Federal Board of Conciliation to mediate between railways and their employees, and provided for voluntary arbitration if mediation failed.

In the recent wage dispute the eastern railways and their train employees agreed to arbitrate, and appointed two arbitrators each to represent them. They were unable to agree upon the two umpires who would actually have the deciding votes, and they were appointed by the Federal Board of Mediation and Conciliation. The umpires were W. D. Baldwin, chairman of the Otis Elevator Company, and E. E. Clark, formerly a member of the Interstate Commerce Commission, and before that president of the Order of Railway Conductors. The award was made by the labor representatives and the umpires. The two representatives of the railway companies dissented. The award is the first definite result of the Watson-Parker Act. It fixes wages slightly higher than the previous maxima of 1920.

The railways introduced testimony showing the decline that has occurred in the cost of living since 1920, and offered various reasons why no advance should be granted. The employees presented evidence regarding advances in wages in building construction and other industries; pointed to the increases in efficiency of railway operation; and contended that their wages should not be measured by the cost of living, or by railway rates and profits, but by the duties and responsibilities of their work. A remarkable feature of the outcome is that the majority arbitrators refrained from stating definitely the reasons for their decision.

Previous to this award the increase in the average annual wage of all railway employees, excepting those in train service, over a period of twelve years had been

121½ per cent. The advances to conductors and trainmen—the classes involved in this arbitration—had averaged only 108 per cent. Other employees are expected to seek advances proportionate to those recently granted. A corresponding increase for all employees in train service—including enginemen—would cost the railways as a whole about 55 million dollars annually. A corresponding increase for all railway employees would cost about 215 million dollars annually. Since train service employees had not previously been advanced as much as others, it may be argued that this advance to them should not be a precedent for others. The western railways may oppose any increase in their wages because they are less prosperous than the eastern and southern lines. Undoubtedly other arbitration boards will have opportunity to decide whether they will follow the precedent just set.

The railways have shown within the last three years that they can so increase efficiency of operation as to offset both increases in their costs and reductions in their rates if they do not come too fast. Advances in wages and taxes, reductions of rates and losses of passenger business between 1923 and 1926 would have reduced their net operating income 300 million dollars annually if there had not been a large increase of freight business and an increase of operating efficiency. What actually occurred was that freight business grew so much, and such economies in operation were effected that in 1926 net operating income was about 250 million dollars larger than in 1923. The explanation of this remarkable performance is to be found mainly in the investment of billions of capital in improvements that saved labor, fuel, and materials. Such economies cannot be continued without a continuance of the investment of a large amount of capital. Capital cannot be obtained unless it is reasonably sure that satisfactory interest and dividends will be paid. The required interest and dividends cannot be paid if wages are increased or rates are reduced faster than economies can be effected.

The most important of all railway questions is how the benefits of growing traffic and enhancing efficiency of operation should be divided among investors, employees, and the public. The most insistent demands for reductions of rates have come from the farmers. Obviously, advances in wages must make more difficult reductions of rates. While the average wage of railway employees is now more than 120 per cent. higher than before the war the average price of farm products is only 40 per cent. higher. This recent advance in wages was granted by a board, the umpires of which were appointed by a government body. What may be said about this by farmers who ask government aid to raise the prices of their products?

It is essential to prosperity that high production should result in correspondingly high wages. Consumers must be able to buy their output as producers, or there will be no prosperity. But the economic situation already is out of balance because farm prices and farm incomes are too low in proportion to those in industry. The farmers must prosper to make them a good market for the products of industry. Present conditions in most kinds of business are good, but every development that tends to put the economic situation further out of balance is fraught with danger. The farmers have great political power, and unless they prosper as much as other classes they may compel the government to adopt measures ostensibly in their interest that will in the long run do harm to all classes.

What Can a Farmer Do?

THE ANNUAL REPORT of the Secretary of Agriculture maintains that the condition of the farming industry has improved materially in the last year and that the net return on money invested in the agricultural industry was 4.6 per cent. last year, as compared with 4 per cent. the previous year, 3.1 per cent. in 1922-23, and 0.6 per cent. in the crop year of 1921. The industry has indeed come back a long way from recent ruinous years, but it must come back still more.

What can a farmer do to improve the condition of his industry? Those who are not farmers say that he will not find a solution of economic difficulties in politics, and yet his voting power is so large that politics can hardly refrain from offering him legislative panaceas. The farm problem is purely an economic problem, and should be considered as such. It has been dealt with largely as a political problem, solely because of the political power of the farmer, and we have got nowhere.

Improved economic conditions alone have benefited the farmer in recent years, for he has failed in every effort to force through bills which would have provided subsidies of one kind or another. But if we should start on another cycle of wage increases the full recovery of the farm industry would be delayed, for high wages are reflected more in the cost of the farmers' tools and fertilizers than in the amounts he receives for his products—and he would continue to resort to politics as a cure for economic ills. Great increases in rail wages, for instance, as pointed out in a preceding editorial, might affect the farmer if rates were increased. As the Secretary of Agriculture says:

> It is my conviction, often stated, that we must have substantial readjustments in freight rates. There have been no freight rate reductions of importance on agricultural commodities in the last year. The Department of Agriculture's index of freight rates indicates that they are still 58 per cent. higher than before the war. It is instructive to compare this figure with the index for farm commodity prices, which in September stood at only 34 per cent. above the pre-war level.
>
> What rail transportation charges sometimes mean to the farmer can be realized from an illustration or two. It costs 26.4 cts. to ship a bushel of wheat from Wichita, Kans., to the Gulf of Mexico. It costs 27.8 cts. a bushel on the average to ship wheat from the spring-wheat area to the Atlantic seaboard. These freight costs are large relatively as well as absolutely. They place the American farmer at a disadvantage of from 4 to 10 cts. a bushel in comparison with the freight costs of his competitors in Canada and Argentina.
>
> In the export field our shipments of agricultural products have not held up a high average in comparison with other products. In 1901, our agricultural products made up 65.2 per cent. of our total exports, and the trend has been downward ever since—in 1913, it was 43.6 per cent.; in 1919, it was 50.6 per cent., because of the war; in 1925, it was 44.2 per cent.; and in 1926, it was 40.6 per cent. But rail rates and wages are not political problems now; machinery exists for adjusting both rates and wages without reference to Congress.
>
> The remedy for the farm problem lies in economic adjustments—in the expansion of marketing facilities so that our farmers can get their surplus into competition in foreign markets at low cost. And how? There lies the question no one has been able to answer yet. The man with the right answer probably can be President.

Can Railroad Revenues Keep Up?

AT THE BEGINNING of the new year the difficulties the railways probably will encounter in 1927 in trying to equal the net operating income earned in 1926 loom somewhat larger than they did several weeks ago.

They could not have secured the large increase in net obtained in 1926 without the large increase in freight business that occurred. There seems to have been recently an increase in the number of indications that the country is entering a short period of more or less reduced activity in general business. The railways' freight business depends upon the general activity of industry and commerce.

Without an increase of freight business there would be no increase, but probably a reduction, of total earnings, due to the steady decline of the general level of rates and also to the loss of passenger business which still continues. Taxes, no doubt, will further increase. Advances in wages already granted will cost a good deal and others already are being sought.

It does not necessarily follow that the operation of the influences mentioned would reduce the net return earned. They

were all present in 1924, and yet because of economies in operation the net earnings increased, although it produced a smaller percentage of return on property investment than in 1923. The effect produced by such influences depends upon their strength.

Recent reports of carloadings add support to the view that traffic in the early part of the year, excepting, perhaps, shipments of coal in anticipation of a strike, may not be quite so large as last year. Of course the railways cannot expect such an increase in freight business every year as that of last year, which was the largest since 1917. Those who pass upon the rates they may charge and the wages they should pay should not, however, overlook the fact that their ability to increase net operation income as much as they did last year was largely due to a freight business that broke all records, and that net returns earned in years of record-breaking business are no measure of what can be earned in years when traffic does not increase or decline.

There is apparently no reason at present for anticipating that the railways will not have a freight business in 1927 at least equal to any they ever had prior to 1926, but there are indications that the recent growth of traffic will not be maintained in the near future, and estimates of future financial results must take this into account.

The Perennial Mexican Squabble

A CAREFUL READING of the four notes exchanged by our State Department and the Government of Mexico from July to November of last year, leads to the conclusion that the Mexican question, instead of approaching a solution, is drifting into a state of confirmed and fruitless altercation from which a rational solution is less and less likely to emerge. Dispute with Mexico thus promises to become one of the hardiest of our perennials.

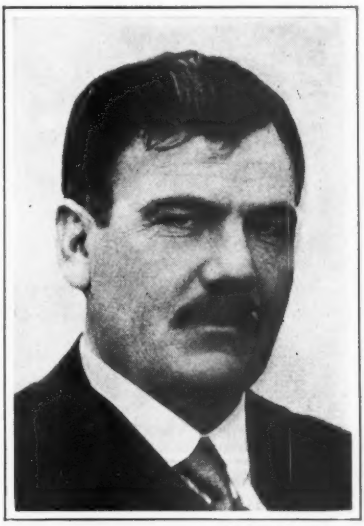
The Mexican spokesmen scout the idea that the principles of Bolshevism have made any progress in their country. They insist that in its recent legislation the government is merely attempting to strengthen the economic structure of the country and has no thought of injuring the rights of foreigners who have invested in Mexico or of confiscating their investments. To be sure, there is apparent none of the blatant denunciation of "*bourgeois* morality" which sometimes emanates from Moscow. On the other hand, there is a polite but deliberate twisting of logic, *bourgeois* or otherwise, which bespeaks either rank dishonesty or such inept *naïveté* as to render it dangerous to have men who indulge in it at the head of a powerful state.

A detailed examination of the Mexican position would require a rehearsal of the whole correspondence, but a restatement of one point will serve as an example of its general trend. The Constitution of 1917 declares that all mineral deposits are the property of the nation and inalienable. The right to exploit them may be granted to foreigners upon condition that they agree "to be considered Mexicans in respect to such property, and accordingly not to invoke the protection of their governments in respect to the same, under penalty, in case of breach, of forfeiture to the nation of the property so acquired."

As this provision applied to mineral property already acquired by American citizens and, if enforced, would operate to deprive them of their titles, the Wilson Administration made vigorous protest against its application in such cases. It was not enforced at the time, but when Obregon rose to power, Washington feared that he would attempt to make the objectionable provisions operative. Recognition was withheld until the Payne-Warren Mission secured a promise that American citizens would be protected in their rights. Recognition followed and Obregon respected the agreement. His successor, President Calles, however, was minded to ignore the agreement and to enforce the Constitution. He secured the passage of a law, promulgated on December 31, 1925, which requires all foreign owners of oil lands to apply within one year for a "con-

cession" to exploit their properties. This concession must not exceed fifty years in duration and can be granted only to foreigners complying with the constitutional provision requiring renunciation of the protection of their own governments. Failure to make application for the concession works a forfeiture of title.

Here is a clear case where an owner of property, having paid a purchase price and obtained under existing law a fee simple—absolute ownership for all time—is faced with the alternative of surrendering his title for a fifty-year concession, which shall be at the mercy of similar confiscatory laws in the future, and renouncing his government's protection, or of forfeiting his title altogether. The process may lack the brutal frankness of the Russian procedure, but there are striking similarities in the ultimate results.



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PRESIDENT CALLES OF MEXICO
Foreign-owned properties in his country face virtual confiscation.

Foreign Minister Saenz's assurances are far from assuring. Suavely waving aside the promises given the Payne-Warren Mission, he indulges in the following gem of acrobatic reasoning:

> To grant a concession in exchange for an actual title is to confirm the latter, because the granting of the concession will have no other foundation than respect for the former, and although it is true that concessions are for a limited duration of time, on the one hand, to determine the period for the future exercise of a right is not to proceed retroactively, because it does not modify the effects already consummated of a right, but only applies a rule for future use, and, on the other hand, the period of a concession having expired, the latter may be extended or another obtained, therefore in practice no prejudice is caused by the application of the precepts under consideration.

No lengthy commentary is necessary to point out the insincerity of a claim that the substitution of a concession, whose duration may be shortened at pleasure, for an absolute title, causes "no prejudice" to the owner. Such a claim jeopardizes and renders unsalable every American title in Mexico. A government basing its laws upon such distorted logic will be always and completely at odds with the Government of the United States or any other self-respecting country. It is the duty of the State Department to exert every effort to protect the property of American citizens in Mexico against this insidious form of confiscation, even though that property be largely that of oil barons who stand none too high in public favor at home. To permit American citizens to be stripped of their Mexican properties by any such thinly disguised expropriation would be to invite repeated affronts of a similar nature.

Nicaragua and the Monroe Doctrine

WHILE the Mexican Government is challenging the United States on the question of American property rights in Mexico itself, it has also thrown down the gage in Central America. The Mexican leaders have for some time been endeavoring to extend Mexican influence among the smaller republics to the south by donating wireless plants, establishing scholarships for Central American youths in Mexican universities, and otherwise seeking the favor of the people. The quarrel between Díaz and Sacasa in Nicaragua offered Mexico an opportunity to put her newly

won prestige to the test and she willingly accepted it.

Probably as good an argument can be advanced for the constitutionality of Sacasa's claim as for Díaz's. Constitutional processes in the smaller Latin-American republics are sufficiently nebulous to lend themselves to various interpretations. Díaz bases his claim on election by the Nicaraguan Congress in the absence of both the President and Vice-President from the country. The constitution provides for such an election. Sacasa, who was formerly Vice-President, stands on his right to succeed to the Presidency and asserts that his absence from the country was due to persecution by General Chamorro, who drove out President Solorzano and whose action paved the way for the Díaz election.

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REAR ADMIRAL JULIAN L. LATIMER

Representative of the United States in Latin America's latest revolution.

The State Department, in its desire to see order restored in Nicaragua, recognized Díaz as the President of the country and at the same time threw out the suggestion that Mexico, under Bolshevik influence, was extending aid in the shape of arms, munitions, and money to the Liberal revolutionists who were supporting Sacasa. The injection of the Bolshevik scare was perhaps awkwardly done. But the fact remains that, in the Nicaragua matter as in the case of its own current dispute with Mexico, the State Department is confronted with the methods if not with the principles of a system much more closely allied to that of Moscow than to our own.

ADOLPHO DÍAZ

Recognized by the United States and other great powers as the President of Nicaragua.

Mexico promptly retorted by recognizing Sacasa as President of Nicaragua and thus placed herself in direct opposition to the United States. This opposition is fraught with additional danger to peaceful relations between Mexico and the United States. For thirteen years, from 1912 to 1925, American marines preserved order and maintained the stability of the constituted government in Nicaragua. They were withdrawn in the hope that the country had become sufficiently organized to stand alone. This hope proved vain and our forces are again in Nicaragua. As in the case of Cuba, Haiti, the Dominican Republic, Panama, and possibly other countries, we have tacitly accepted the responsibility for keeping the peace and holding in check the tendency to continuous revolt.

Following these long-standing precedents, we should ordinarily take whatever steps might become necessary in the case of the Díaz *régime*. There is of course no legal justification for such action other than our own fiat based upon the Monroe Doctrine. Mexico's right to assert her own intention to keep the peace and support duly constituted government in the case of her southern neighbor, is juridically as good as ours. But where the government she recognizes and chooses to support is in open conflict with the one we recognize and choose to support, the implications are not of the happiest. Several courses would then be open to the United States.

We could withdraw and surrender control of the situation to Mexico. We might make an agreement with Mexico by which we should both withdraw and let revolution run its picturesque and unending course. We might make an agreement with Mexico for the exercise of joint control and thus reconcile diametrically opposing claims. Or we can maintain our supremacy in the Western hemisphere regardless of the Mexican claims and regardless of the extremes to which we may be required to go to accomplish this end.

The first two courses we are not likely seriously to consider. The third, even if it were desirable, is not within the range of probability in the present temper of Mexico City. The last may require a restatement of the Monroe Doctrine to exclude not only European and Asiatic aggression against the weaker American states, but any form of political penetration into one of these states by one or more of its American neighbors. If the Mexican Government is as inclined to the Communist philosophy as some claim it is, our own interests would dictate such an extension of the Doctrine and a determined opposition to the spread of Mexican influence in Nicaragua or anywhere else.

Partitioning China Again

CHINA has recently had her share of bedevilment. Things seem to be approaching a crisis, although it would be unduly optimistic to say that the end of the trouble is in sight. The Canton government has taken the center of the stage and pushed the older actors, the Changs and the Wus, the Tsaos and the Suns, well into the background.

There is a reason for this. For the first time since the revolution in 1911, principles have become a real factor in Chinese affairs. Wu and Chang, Sun and Tsao, all profess their devotion to political principles, but power and pelf have governed their actions. That is why all of them have been swept together in opposition to the northward drive of the Cantonese forces.

The leaders of the Cantonese are the heirs of Sun Yat Sen, the prophet of the Chinese Revolution, and a man so devoted to principle that he was unable to accomplish anything beyond the inspiration of his followers. Despite many and dire vicissitudes, the Sun Yat Sen idea of organizing the Chinese along modern democratic lines has gained a foothold at Canton. From there the propaganda has spread through all China. Since last summer, under the brilliant leadership of Chiang Kai Shek, the armies of Canton have been extending the area under Cantonese control. They now hold the central Yangtsze valley with its great industrial cities and all southern China, as far north as the neighborhood of Hangchow. They are headed for Nanking and Shanghai, and Peking itself is probably on their itinerary.

Many observers, particularly those among the British living in China, have been quick to ascribe both the ideals and the successes of the Cantonese to Moscow. And Moscow has been as ready to take the credit. There is no denial of the fact that Soviet agents have been active at Canton. There is no denial of the employment of many Soviet "advisers" in the Canton ministries. There is no denial of the participation of Russian officers in the training of the Canton troops and in the planning of Chiang's campaign. There is no denial that at least the Left wing of the Kuomingtang, the People's party, which is the political organization of Cantonism, is fairly thoroughly permeated with Bolshevik philosophy. And echoes of their vociferations are heard through the whole organization.

So impressed were the British with this Soviet influence that their papers demanded an agreement with the Cantonese in an attempt to supplant Soviet domination by British control. Back of this, but not emphasized, was the thought that Canton might be recognized as the government of South China in return for the Cantonese recognition of Peking as the government of North China.

This suggestion revived at once the talk of dividing China into a number of small units, instead of trying to deal with such

a vast country and such a numerous population as one state. Sympathetic reception was accorded this idea by interested sections of public opinion in Paris and Tokyo and even in Moscow. Imperialist instincts will not easily down, and there are still Britons, Japanese, Frenchmen, and Russians who like to think of China as a memory, her territory and her people partitioned into thriving colonies kept in order and at productive labor by London, Paris, Tokyo, and Moscow.

There are a number of reasons why such a vision is not likely to be realized. First, the Chinese. The sense of Chinese national unity has grown to amazing proportions during the last few years. There has been, it is true, a constant struggle between the war lords, and the people have had little opportunity to organize themselves politically. It may even be that such organization is too great a task. But the Chinese are determined to try it, and any attempt to increase foreign domination would meet with bitter and sanguinary resistance.

Another fly in the partition ointment is the fact that the imperialist dreamers of London, Paris, Tokyo, and Moscow do not dream the same dream. Moscow's visionary map, for instance, would show Manchuria, Mongolia, and much of north China in honest Bolshevik red. Tokyo's would as surely show a large part of this territory in imperial yellow. London and Paris would disagree as widely on the location of dividing lines farther south. In short, an attempt to partition China would at once throw into open conflict the rival expansive forces which are at present held in check and kept apart by the inert buffer of impotent China. The touchiness of these cross-rivalries is strikingly shown by the open and sharp dissent of France and Japan from the proposals of the British Christmas note suggesting more liberal treatment of China.

The third force against partition is the United States. During an intercourse with China paralleling our whole national history we have striven to uphold the territorial and administrative integrity of that country against foreign aggression. Sometimes there have been minor failures, but in general this policy has been successful, and Washington still holds to it.

There has been no particular altruism in this attitude. Americans have realized from the first that if the European empires and Japan were to partition China among themselves the manufacturers and traders of this country would soon be cut off from that huge portion of the earth and its people. The "open door" for our trade and commerce is more important to-day than at any time in our history. To the commercial incentive to resist the partition of China there is now added the earnest desire to prevent the loosing of the rival forces of empire with their serious threat to the peace of the world.

What Followed Lawrence

IN THIS ISSUE the WORLD'S WORK starts publication of a series of installments from one of the most remarkable personal narratives of modern times—the story of Lieut.-Col. Thomas Edward Lawrence of the British Army, who was the moving spirit of the great movement of the Arabs for the liberation of their land from the domination of the oppressive Turk and who, because of his knowledge of the Arabs and a peculiar sort of military genius and daring, rose from the rank of a mere lieutenant in the British Army to the responsibilities and authority of a lieutenant-general (but without that title), commanding the victorious Arab host and the right wing of Allenby's army.

The natural remark of the reader may be: "Who is this Lawrence? I never heard of him." The fact is that he was a real flesh-and-blood person who will undoubtedly be regarded as one of the outstanding heroes of the war—one of the most romantic and mysterious figures in all human history. As generations pass, the story of this shy, modest youth will grow and epics will cluster around his illustrious name. Because he was modest and because it was policy during the war to say little of the British participation in the Arab war for liberation, little was known of the exploits of this diminutive but wise and canny

leader, but his fame is bound to grow, not only because it was a real fame but also because it will be nurtured in a mysterious land—the land of "The Arabian Nights."

But the political Arabia which Lawrence knew and espoused has vanished. The family of Hussein—direct descendants of the Prophet—cherished a dream of a United States of Arabia, a great nation which should be a worthy successor to the ancient Moslem Empire. The strength of the members of that family was not great enough to fulfill that ambition. Hussein himself could not rise to his great ambition of becoming the Caliph of Islam, he lost control of the Holy Places, and was asked by the British to retire to Cyprus. Feisal, who appears as a great leader in Colonel Lawrence's story, was expelled from Damascus by the French—who had the mandate over Syria—though he rules to-day in Bagdad as monarch of Iraq, where the British have a mandate.

Meantime, another great chieftain has arisen in Arabia—Sultan Ibn Saud of Nejd, a central Arabian potentate who by his strength has acquired domination over Hejaz and the Holy Places and who might lay claim to the title of Caliph if he wished. The force and personality of this leader of the Wahabis has brought about a new order in unstable Arabia. Though there are many other factors in this most involved political situation in an always chaotic land, the greatest and most potent of them all is this new leader—Ibn Saud.

The Third British Empire

By James G. McDonald
Chairman, Foreign Policy Association

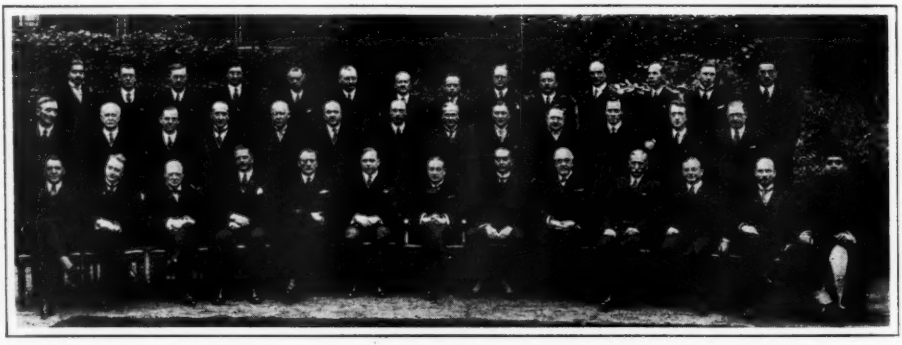
THE THIRD British Empire has now been formally introduced to the world. The British Prime Minister seized upon this felicitous phrase of Dr. Alfred Zimmern's to designate the changed entity which disclosed itself at the recent Imperial Conference in London. Nothing in the summary of proceedings in that conference transcends in interest the report of the Inter-Imperial Relations Committee. It is at once a review and a prophecy. It epitomizes the practical results which recent political developments in the self-governing Dominions have had upon imperial relations. It proposes formulas to serve as a starting point in regulating the future transaction of the Empire's routine business. It is an epoch-marking document, giving formal recognition to that rapid metamorphosis of the Dominions which has been taking place since the war.

A detailed consideration of the pronouncement adopted by this year's Imperial Conference cannot fail to impress the reader with a sense of the difference existing between the new British Empire and the Empire of our history books. For the self-governing Dominions there are few vestiges left of that First Empire which never recovered from the blow dealt it by the American Revolution. They have only a little more in common with the Second Empire which may be said to have flourished between 1776 and 1914.

Consider one of the first principles of the Third Empire—"Equality of status so far as Britain and the Dominions are concerned is the root principle governing our inter-imperial relations." Such a pronouncement could not have issued from the mouth of a Pitt. Neither could it have come with much conviction from a Disraeli. But to-day the head of a Conservative Government in Great Britain has sponsored the statement, and given his approval to the already famous definition of the position and mutual relation of the self-governing Dominions. "They are," the report reads, "autonomous communities within the British Empire, equal in status, in no way subordinate one to another in any aspect of their domestic or external affairs, though united by common

allegiance to the Crown and freely associated as members of the British Commonwealth of Nations."

The question immediately arises as to how this equality of status will work in practice. How will it affect the relations of foreign nations with the various units of the British Commonwealth of Nations?



THE IMPERIAL CONFERENCE ASSEMBLED AT 10 DOWNING STREET

Representatives of the self-governing British Dominions. Seated (left to right) are: Lord Birkenhead, W. T. Cosgrave, Winston Churchill, J. G. Coates, Sir Austen Chamberlain, Mackenzie King, Prime Minister Stanley Baldwin, Stanley M. Bruce, Lord Balfour, General J. B. M. Hertzog, L. S. Amery, W. S. Monroe, and the Maharajah of Burdwan.

Where is responsibility for the conduct of a consistent foreign policy to lie? Is equality of status to imply equality of function also? "It was frankly recognized," the report stated, "that in this sphere as in the sphere of defense, the major share of responsibility rests now and must for some time to come continue to rest with His Majesty's Government in Great Britain." Great Britain will thus continue to have a preponderant influence in imperial councils on foreign policy.

At the same time, since practically all the Dominions are engaged to some extent in the conduct of foreign relations, particularly with neighboring countries, it was declared that "the governing consideration underlying all the discussions of this problem must be that neither Great Britain nor the Dominions could be committed to acceptance of active obligations except with the definite assent of their own governments." Treaties may henceforward be concluded on the initiative of any of the Dominions. But a negotiating Dominion must first signify its intention to each of the other Dominions so that they may intimate whether or not their interests are likely to be affected by the proposed agreement. In no case may steps be taken which will involve other self-governing parts of the Empire in any active obligations without first obtaining their definite assent.

But who is to negotiate and sign foreign treaties—Great Britain or the Dominions? And is the whole Empire bound by each treaty affecting any of its parts? These and other similar difficulties were met by the simple expedient of providing that treaties with foreign countries are to be made in the name of the King, as representing Empire unity, at the same time that they are signed by Dominion plenipotentiaries as a symbol of adherence to the treaties by the particular Dominions which such plenipotentiaries represent. Thus, in the case of a treaty which is to apply to only one part of the Empire, it is to be negotiated by the King on behalf of that Dominion whose plenipotentiary signs the document. Foreign nations are to understand that terms of treaties are not to be regarded as regulating the rights and obligations of British Dominions other than those on behalf of which they have been signed in the name of the King. Full powers are issued to plenipotentiaries in each case by the King on advice of the Dominion Government concerned. Thus

in respect to foreign relations, both the rights of Dominions and the unity of the Empire receive consideration.

Of special interest to the Dominions themselves are the sections of the report which deal with mutual relations within the Empire. The British Privy Council will continue to stand as the highest court of appeal in the Empire, despite the contention of various nationalist groups that no appeal should be allowed from decisions of the highest Dominion courts. On the other hand, concession is made to nationalist demands in the suggestion that Governors-General should henceforth be regarded as representatives of the Crown, "holding in all essential respects the same position in relation to the administration of public affairs in a Dominion as is held by His Majesty the King in Great Britain." Such a provision practically prevents interference by Governors-General with the work of Dominion legislatures. Governors-General are not representatives or agents of any party government in Great Britain, nor are they responsible to any department of the British Government.

Certain legal restrictions such as the right of disallowance of Dominion legislation by the King still exist, which, in theory perhaps more than in practice, hamper Dominion legislation. Another restriction is implied in the theoretical validity in the Dominions of legislation enacted at Westminster. It is proposed that expert committees be appointed to examine such restrictions and to revise regulations governing merchant shipping. Meanwhile, it is recognized that as far as disallowance and reservation of Dominion legislation by the British Government are concerned, "apart from the provisions, embodied in the constitutions or in specific statutes expressly providing for reservation . . . it is the right of the government of each Dominion to advise the Crown in all matters relating to its own affairs." In the same spirit it is recognized that "legislation by the Parliament at Westminster applying to a Dominion would only be passed with the consent of the Dominion concerned."

The report has been acclaimed in the Dominions even by those political parties which, as in the case of South Africa, have been loudest in their pleas for separation from the Empire. At a period when talk of disintegration was being bandied about the report has had an electrical effect. It has integrated and given direction to imperial activity. And it has done so by the simple means of describing and acquiescing in the gains which the Dominions have in practice so recently achieved.

The Outlook for International Business

By Dr. Julius Klein

Director, U. S. Bureau of Foreign and Domestic Commerce

THE SPECTACULAR but all too frequently inconsequential bickerings of international politics which clutter up our front page headlines often mislead the casual observer as to the actual trend of the world's business. As a matter of fact, these superficial uncertainties give an entirely inaccurate impression, for the world's commercial affairs are moving steadily forward along the road toward substantial recovery. The aggregate value of the foreign trade (exports and imports combined) of seventy-four countries, representing all but an insignificant fraction of the total world trade, will reach a formidable figure well over sixty-five billion dollars for 1926, according to preliminary calculations of the Department of Commerce. After allowing for variations in price levels, this total registers, for the first time since the outbreak of the war, a substantial advance in trade volume over 1913.

Naturally, Europe is showing a greater ratio of advancement as compared with the rest of the world, since she has relatively far more ground to recover before reaching her pre-war level. The impressive speed of her progress in recent years is brought

out by the fact that whereas in 1921 the exports of Europe were considerably less than half those of 1913 in actual volume, they are now well over 80 per cent. of the last pre-war year. In value this has meant an expansion from a little over nine billion dollars in 1921 to nearly fourteen and one half billions in 1925, an increase of some 58 per cent. as compared with 10 per cent. in our own case during the same time.

In this connection one must note the conspicuous advance of Italy, whose foreign trade has increased 105 per cent. during the last four years, while that of Germany rose 75 per cent., France 47 per cent., and the United Kingdom 44 per cent. Some of the smaller new nations in which American capital is interested have shown striking vitality: Jugoslavia has expanded her exports 159 per cent. since 1921 and Hungary 176 per cent.

In view of these impressive European gains, there have been occasional doubts expressed as to the strength of our position in international trade in view of the relatively much more modest growth of our exports, which are now running about 24 per cent. over 1922, the "bottom year" in our exports since the war, while our imports are showing a 47 per cent. growth over the same period. This discrepancy by no means indicates any impairment of strength in our foreign trade position, since our trade by no means reached the abnormal depths of that of Europe. Then too, several of the principal exports of the United States, notably cotton and certain cereals, are now moving at lower prices, whereas certain of the major imports of this country, notably rubber, have advanced considerably in unit cost.

The crux of the problem of recovery in the world's business is the rehabilitation of Europe, both as a consumer and as a producer. It is more than gratifying, therefore, to note the passing of numerous significant mile-stones along the road toward recovery. For example, more than one hundred commercial treaties have been signed since the Armistice, the majority of them based upon most-favored-nation understandings, which indicates a growing determination to accommodate the measures of trade control adapted by one nation to the needs of another. Then, too, there is the significant fact that the Geneva Customs Convention of 1923 has already been ratified by some forty nations, thereby introducing widespread standardization of practices and rules in customs procedure, enormously facilitating international traffic and curtailing not only costs but incidental irritations which so frequently lead to graver misunderstanding. The outlook for 1926–27 clearly points to even further relaxation of international trade limitations, particularly with reference to the license restrictions upon certain commodities which have been especially conspicuous among the reorganized and new Continental governments.

Among the more significant evidences of business recovery is that involving international exchange rates. Whereas in 1921 currencies of practically every country of Europe were below par in terms of dollars, at present there are only four which are suffering from exchange difficulties and 1927 should see a material improvement, if not the actual elimination, of this situation.

The significance of this recovery in the purchasing power of Old World currencies is in its direct reaction, not only upon the United States but also upon the great raw-material producers of Asia and Latin America. We sometimes regard Europe as a market solely for our agricultural surplus and a few minerals, notably copper and petroleum, but the Old World is recognizing as never before the real values in American manufactures for the rehabilitation of its war-shattered industries. Our sales of manufactures to Europe averaged slightly more than two hundred million dollars a year in 1910-14, whereas last year they ran considerably in excess of five hundred and thirty millions, and if the exports of semi-manufactured commodities be added to the list, we have a total of nearly one billion dollars. Even allowing for substantial price changes since 1914, these figures represent an impressive growth in our sales of automobiles, motion pictures, office equipment, machinery, and scores of other American specialties to the Old World.

Turning to our domestic trade situation as an element in the world's business, it is frequently alleged that the tremendous strides of American industry in recent years have emphasized our economic independence, especially from Europe, and have thereby materially curtailed the possibility of European markets here with consequent impairment of Old World recovery. The actual circumstances are quite the reverse, and this without serious consequences to our industries. In fact, it is being increasingly realized in well-informed European circles that the reservoir of economic strength in the United States constitutes an invaluable source of sadly needed nourishment for Europe. If it were not for the onward march of prosperity in the United States it would not have been possible for us to increase our loans of private capital to Old World enterprises from three hundred million dollars in 1912 to three billions one hundred millions at the close of 1926, nor would it have been possible to send across the Atlantic a tide of American tourists whose expenditures in Europe exceeded four hundred million dollars in 1926 as compared with one hundred and seventy five millions in 1912.

These figures form a most effective answer to any ravings of transatlantic politicians or poets as to the "cold-blooded detachment" of the United States. The alleged obstruction of importations of European luxuries into the United States is likewise largely fiction. In almost every case the growing prosperity of this country is providing a steadily increasing market for European specialties, and there is every reason to believe that the outlook for the near future assures a continuance of that trend. We are today taking a larger proportion of the exports of the leading European nations than we did before the war. For instance, in 1913 about 5.6 per cent. of the total exports of the United Kingdom were sold in the United States, but our share is now well in excess of 7.5 per cent. In the case of France the advance during the same time has been from 6.1 per cent, to nearly 7 per cent., and with Spain we have increased our proportion of her world exports from 6.9 per cent. before the war to more than 10 per cent. to-day. The assurance of prosperity in the United States would, therefore, seem to be a definite contribution of decided value to the Old World as well as to Latin America and the trans-pacific countries, from which we are taking a steadily increasing proportion of their total world's sales.

It is reassuring for the world's business in general, therefore, to note the general tone of confidence in the United States. Although there may be little of that more exuberant tone of a year ago, which arose from the speculative situation late in 1924, the trend as a whole, according to the indications tabulated by the Department of Commerce, is clearly toward steadily increasing volume of trade with moderate, salutary profits. Even in the still troubled circles of the textile and shoe industries, there is an unmistakable tone of recovery, in the former particularly because of the declining price of raw material. In this connection, it might be well to note that the depressing psychological reaction throughout the South because of the cotton surplus is being checked in part by the frank and vigorous collaborative measures of financial and trade circles. There is also evident the counter balancing factor of those relatively new southern industries which are dependent upon markets remote from the South. The probable stimulation of cotton demands in European textile circles because of low prices for raw material is likewise promising, supplemented in the case of England by the settlement of the coal strike.

Practically all of the accepted indices of business conditions point toward a moderate but unmistakable steady advance during the coming months. The outlook for winter building indicates the probable absorption of all available labor in that important activity. The index of check payments shows a small but substantial increase in the dollar volume of trade, and the continued record figures of car loadings, even after allowance is made for the stimulation of our coal traffic by the British strike, still indicates a decidedly healthy distribution activity.

LAWRENCE OF ARABIA
As the shy British "Shavetail" who chafed under army discipline.

Lawrence *of* Arabia

An Introduction to the Story of the Most Remarkable Adventurer of Modern Times

ONE DAY not long after Allenby had captured Jerusalem, I happened to be in front of a bazaar stall on Christian Street, remonstrating with a fat old Turkish shopkeeper who was attempting to relieve me of twenty piasters for a handful of dates. My attention was suddenly drawn to a group of Arabs walking in the direction of the Damascus Gate. The fact that they were Arabs was not what caused me to drop my tirade against the high cost of dates, for Palestine, as all men know, is inhabited by a far greater number of Arabs than Jews. My curiosity was excited by a single Bedouin, who stood out in sharp relief from all his companions. He was wearing an agal, kuffieh, and an aba such as are worn only by Near Eastern potentates. In his belt was fastened the short curved sword of a prince of Mecca, insignia worn by descendants of the Prophet.

A stranger must, indeed, have something extraordinary about him to attract attention in the streets of the Holy City. But as this young Bedouin passed by in his magnificient royal robes the crowds in front of the bazaars turned to look at him. It was not merely his costume, nor yet the dignity with which he carried his 5 feet 3, marking him every inch a king, or perhaps a caliph in disguise who had stepped out of the pages of "The Arabian Nights." The striking fact was that this mysterious prince of Mecca looked no more like a son of Ishmael than an Abyssinian looks like one of Stefansson's red-haired Eskimos.

Bedouins, although of the Caucasian race, have had their skins scorched by the relentless desert sun until their complexions are the color of lava. But this young man was as blond as a Scandinavian, in whose veins flow viking blood and the cool traditions of fiords and sagas. The nomadic sons of Ishmael all wear flowing beards, as their ancestors did in the time of Esau. This youth, with the curved gold sword, was clean-shaven. He walked rapidly, with his hands folded, his blue eyes oblivious to his surroundings, and he seemed wrapped in some inner contemplation. My first thought as I glanced at his face was that he might be one of the younger apostles returned to life. His expression

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Who he was *and* what he did

By Lowell Thomas

author of

"With Lawrence in Arabia"

LAWRENCE OF ARABIA
As Prince of Mecca, leader of an Arabian army, and terror of the Turks.

was serene, almost saintly, in its selflessness and repose.

"Who could he be?" I was certain I could obtain some information about him from General Storrs, governor of the Holy City, and so I strolled over in the direction of his palace beyond the old wall, near Solomon's Quarries. General Ronald Storrs, British successor to Pontius Pilate, had been Oriental secretary to the high commissioner of Egypt before the fall of Jerusalem and for years had kept in intimate touch with the peoples of Palestine. He spoke Hebrew, Greek, Latin, and Arabic with the same fluency with which he spoke English. I knew he could tell me about the mysterious blond Bedouin.

"Who is this blue-eyed, fair-haired fellow wandering about the bazaars wearing the curved sword of a prince of——?"

The general did not even let me finish the question but quietly opened the door of an adjoining room. There, seated at the same table where von Falkenhayn had worked out his unsuccessful plan for defeating Allenby, was the Bedouin prince, deeply absorbed in a ponderous tome on archæology.

In introducing us the governor said, "I want you to meet Colonel Lawrence, the Uncrowned King of Arabia."

He shook hands shyly, and with a certain air of aloofness, as if his mind were on buried treasure and not on the affairs of this immediate world of campaigns and warfare. And that was how I first made the acquaintance of one of the most picturesque personalities of modern times, a man who will be emblazoned on the romantic pages of history with Raleigh, Drake, Clive, and Gordon.

During the period of the World War, years crammed with epic events, among others two remarkable figures appeared. The dashing adventures and anecdotes of their careers will furnish golden themes to the writers of the future, as the lives of Ulysses, King Arthur, and Richard the Lion-Hearted did to the poets, troubadours, and chroniclers of other days. One is a massive, towering, square-jawed six-footer, that smashing British cavalry leader, Field Marshal Viscount Allenby, commander of the twentieth-century cru-

saders, who gained world fame because of his exploits in driving the Turks from the Holy Land and bringing to realization the dream of centuries. The other is the undersized, beardless youth whom I first saw absorbed in a technical treatise on the cuneiform inscriptions discovered on the bricks of ancient Babylon, and whose chief interests in life were poetry and archæology.

The spectacular achievements of Thomas Edward Lawrence, the young Oxford graduate, were unknown to the public at the end of the World War. Yet, quietly, without any theatrical head-lines or fanfare of trumpets, he brought the disunited nomadic tribes of Holy and Forbidden Arabia into a unified campaign against their Turkish oppressors, a difficult and splendid stroke of policy, which caliphs, statesmen, and sultans had been unable to accomplish in centuries of effort! Lawrence placed himself at the head of the Bedouin army of the Sherif of Mecca, who was afterward proclaimed king of the Hejaz. He united the wandering tribes of the desert, restored the sacred places of Islam to the descendants of the Prophet, and drove the Turks from Arabia forever. Allenby liberated Palestine, the Holy Land of the Jews and Christians. Lawrence freed Arabia, the Holy Land of millions of Mohammedans.

I had heard of this mystery man many times during the months I was in Palestine with Allenby. The first rumor about Lawrence reached me when I was on the way from Italy to Egypt. An Australian naval officer confided to me that an Englishman was supposed to be in command of an army of wild Bedouins somewhere in the trackless desert of the far-off land of Omar and Abu-Bekr. When I landed in Egypt I heard fantastic tales of his exploits. His name was always mentioned in hushed tones, because at that time the full facts regarding the war in the Land of the Arabian Nights were being kept secret.

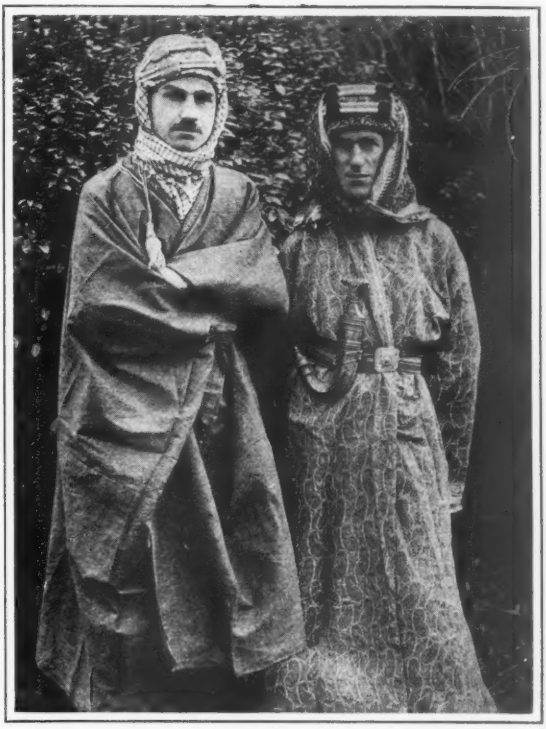
Until the day I met him in the palace of the governor of Jerusalem I was unable to picture him as a real person. So I had come to the conclusion that Lawrence was the product of Western imagination overheated by exuberant contact with the East. But the myth turned out to be very much of a reality. This youth had virtually become the ruler of the Holy Land of the Mohammedans and commander-in-chief of many thousands of Bedouins mounted on racing camels and fleet Arabian horses. He was the terror of the Turks.

Several years before the war, an expedition from Oxford, headed by Lawrence's friend Hogarth, the great antiquarian and

Who Lowell Thomas Is

Author, lecturer, and explorer, Lowell Thomas, an American, went into the Holy Land early in the war as official historian of the epochal events then being developed by the Allied forces in the Near East. He accompanied Allenby's cavalry army which swept the Turks from Palestine, and he was the only person to bring back the pictorial record and eye-witness story of the astonishing deeds of the mysterious Colonel Lawrence in Arabia, one of the most remarkable adventurers of modern times. It was from the lips of Lowell Thomas that the world first heard of this mystery man of the East. Not only has Lowell Thomas's book "With Lawrence in Arabia" been widely read in America and the British Empire, and been translated into many languages, but he has also told the tale of Lawrence's spectacular secret campaign over 4,000 times, to more than 4,000,000 people, in all parts of the world—a lecture record that has never been paralleled. Paragraphs in this introduction are taken from his book "With Lawrence in Arabia," by permission of the author and The Century Company.

archæologist, began excavating in the Euphrates Valley, hoping to uncover trace of that little-known race, the Hittites. Because of his intimate knowledge of their language and his sympathetic understanding of their customs, Lawrence was placed in charge of the digging gangs of unruly Kurds, Turkomans, Armenians, and Arabs. He and his associate, C. Leonard Woolley, director of the expedition, actually uncovered ruins which proved to be the missing link between the civilizations of Nineveh and Babylon and the beginnings of Greek culture in the islands of the Mediterranean, which extend back for five thousand years. The Ashmolean Museum at Oxford contains many exhibits "presented by T. E. Lawrence" before he was twenty years of age.



LOWELL THOMAS AND COLONEL LAWRENCE
Following Allenby's capture of Jerusalem, Lowell Thomas met Lawrence and followed him through the latter half of his war against the Turks.

For seven years Lawrence wandered up and down the desert, often accompanied by Woolley but more frequently alone in native garb. When the war came he at once attempted to enlist as a private in the ranks of "Kitchener's Mob." But members of the Army Medical Board looked at the frail, five-foot-three, tow headed youth, winked at one another, and told him to run home to his mother and wait until the next war.

Just four years after he had been turned down as physically unfit for the ranks, this young Oxford graduate, small of stature, shy and scholarly as ever, entered Damascus at the head of his victorious Arabian army. Imagine what the members of the medical board would have said if some one had suggested to them in 1914 that three or four years later this same young man would decline knighthood and the rank of general and would even avoid the coveted Victoria Cross and various other honors!

After his rejection Lawrence returned to his ancient ruins and toiled lovingly over inscriptions that unlocked the secrets of civilizations that flourished and crumbled to dust thousands of years ago. But with many other scientists, scholars, and a few young men of exceptional ability, such as Mark Sykes, Aubrey Herbert, Cornwallis, Newcombe, and others, he was summoned to headquarters in Cairo by Sir Gilbert F. Clayton. Though he was then only twenty-six years old, he was already familiar with Turkey, Palestine, Arabia, Mesopotamia, and Persia. He had lived with the wild tribesmen of the interior, as well as with the inhabitants of the principal cities such as Aleppo, Mosul, Bagdad, Beirut, Jerusalem, and Damascus; and in fact, his knowledge of some parts of the Near East was unique. He not only spoke many of the languages, but he knew the customs of all the different nationalities and their historical development.

It was in the summer of 1915 that the Hejaz Arabs broke out in revolt against their Turkish masters in that part of the

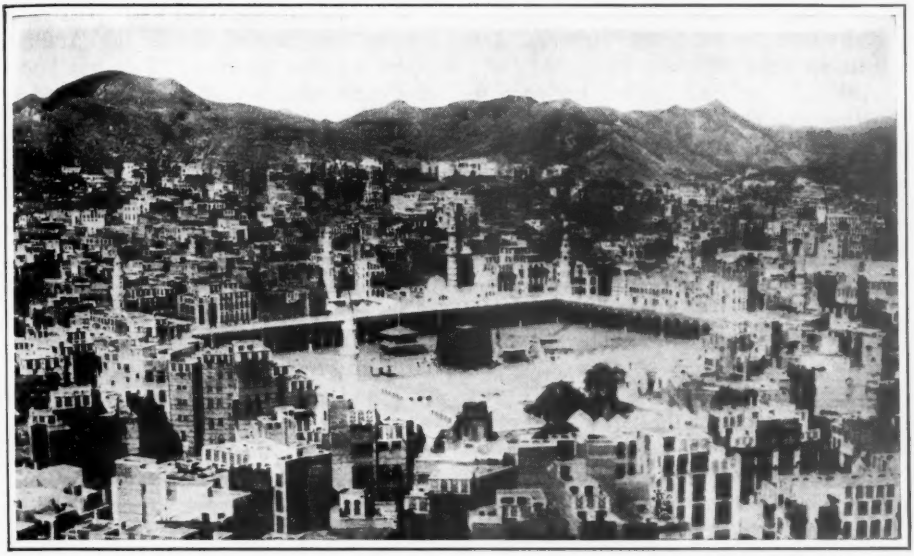
Arabian peninsula which lies mainly between the Forbidden City of Mecca and the southern end of the Dead Sea, known as Holy Arabia. Ever since the decline of the Arabian Empire, more than a thousand years ago, generals, sultans, and caliphs have attempted to unify the peoples of Arabia, and particularly of the province of the Hejaz, because it contains the two sacred Mohammedan cities—Mecca, birthplace of the Prophet, and Medina, where he is buried.

During the long centuries of uncertain Turkish rule, there had persisted, in the sacred cities of the Hejaz, "the cult of the Blood of Mohammed," with its membership limited to descendants of the Prophet. These people were called sherifs, or nobles, by the other Arabs, and they had never lost their hatred for the Turks, whom they regarded as intruders. So powerful was this cult that the Ottoman Government could not destroy it. However, when sherifs living within reach of the string of fortified Turkish posts along the fringe of the desert protested openly against Ottoman tyranny, the sultan usually "invited" them to come and reside near him in Constantinople. There they would either remain as virtual prisoners or quietly be put out of the way. Abdul Hamid, the last great sultan, was an expert in following this private policy of his predecessors, and among the prominent Arabs he found it the better part of discretion to have near him at the Sublime Porte was one Sherif Hussein of Mecca. He was the oldest living descendant of Mohammed and was therefore believed by many to be the man really entitled to the caliphate, the spiritual and temporal head of Islam.

In the luxurious atmosphere of the Ottoman metropolis Hussein's four sons quite naturally had grown up more like young Turkish bloods than Arab youths. They had spent most of their time rowing on the Bosporous and attending court balls. For six years, Prince Feisal (third and best-known of Hussein's sons) had acted as private secretary to Abdul Hamid. When the Grand Sherif returned to Mecca he immediately summoned his four sons and informed them that they were altogether too effete and too accustomed to the soft ways of Stamboul to suit him. So saying the aged emir fitted the deed to

CAMELS FOR LAWRENCE'S ARABS

Persuaded that they were the only practicable means of transport, the British supplied thousands of these pack camels during the later phases of the campaign against the Turks.



Photograph from Ewing Galloway

MECCA, BIRTHPLACE OF MOHAMMED

Few Christians have seen Mecca which, with Medina, is barred to all but true Mohammedans. In the center of the Great Mosque stands the Kaaba, most sacred shrine of Mohammedans, a cube-shaped, carpet-covered building containing the sacred black stone, said to have fallen from heaven.

the word and ordered them out to patrol the pilgrim routes. These routes are mere camel-tracks across the burning sands connecting the Red Sea coast with Mecca, the Holy City, and the summer capital of Taif, and between Medina and Mecca. They were not permitted to use even tents, but were compelled to sleep in their cloaks. They spent their days chasing robbers.

Early in 1916, when Lieutenant Lawrence was making a reputation for himself with the Secret Corps in Cairo, Grand Sherif Hussein sent word to all the tribes of Holy Arabia to be ready at a moment's notice. Then on June 9th he gave the signal. Simultaneous attacks were launched against Mecca, Jedda, the seaport of the Holy City, and Medina, three of the least-known and most interesting cities in the world. The aged Grand Sherif supervised the attack on Mecca, while Feisal and his brother, Ali, were in command of the force directed against Medina. The Grand Sherif was successful at Mecca. Both Mecca and the near-by seaport of Jedda were captured during the first month's fighting. At Medina the Bedouins, under Sherifs Feisal and Ali, were less successful. Although Feisal and Ali could have brought up cannon from Jedda and perhaps taken the city by storm after a bombardment, Hussein refused to permit this for fear of causing the destruction of the Prophet's tomb.

Then came a long pause. The Arabs were unable to go on with their revolution because they had expended all their ammunition. Sherif Hussein again appeared to the Allies, and the British responded. At that critical moment young Lawrence appeared on the Arabian stage. Chafing under the red tape of army regulations, certain slight differences had arisen between the Chiefs at G.H.Q. and independent young Lawrence. His aversion to saluting superiors, for instance, and his general indifference to all traditional military formalities did not exactly increase his popularity with some of the sterner warriors of the old school. In the Arab uprising Lawrence saw an avenue of escape from the Cairo straitjacket. Ronald Storrs, then Oriental secretary to the high commissioner of Egypt, was ordered to

make a trip down the Red Sea to Jedda, with messages to Emir Hussein, and Lawrence went with him.

Although he had played no part in starting the Hejaz revolution, Lawrence had long realized the possibility of the Arabs' helping to prick the kaiser's imperialistic bubble; so he asked permission to take a fortnight's vacation, and he has been on that leave of absence ever since. So absorbed did he become in working out this idea that when his two weeks' furlough came to an end he stayed on in Arabia without even sending apologies to Cairo. From then on Lawrence was the moving spirit in the Arabian revolution.

Had it not been for the youthful Lawrence, King Feisal would not be ruling in Bagdad to-day, nor would his brother, Abdulla, be the sultan of Transjordania, nor would the Arabs have had the opportunity to proclaim Hussein as the Caliph of all Islam and Commander of the Faithful. For it was this young man who destroyed the thousand-year-old network of blood feuds, who built up the Arabian army, who planned the strategy of the desert campaign and led the Arabs into battle, who swept the Turks from a thousand miles of country between Mecca and Damascus, who was the brains of the epic Arabian campaign and rode in triumph through the bazaars of Damascus, and established a government (for the time being) for Prince Feisal in the capital of Omar and Saladin, the oldest surviving city in the world.

This twenty-eight-year-old poet and scholar had started across the Arabian desert to raise an army. I do not know of a more helpless task than this that has been essayed during the last thousand years. At first they had no money, no means of transportation except a few camels, and no means of communication except camel-riders. They were trying to raise and equip an army in a country which has no manufacturing interests, which produces very little food and less water. In many parts of Arabia water-holes are five days' camel trek apart. They had no laws to help them, and they were trying to raise an army among the Bedouin tribes that had been separated from one another by blood feuds for hundreds of years. They were trying to unify a people who quarrel over the possession of the water-holes and pasture lands of Arabia, and war with one another for the possession of camels; a people who, when they meet in the desert, usually substitute volleys of pot-shots for the conventional rules of Oriental courtesy.

In habit, instinct, and mental outlook Europe is utterly at variance with Asia, and it is rarely, only once in hundreds of years, that there comes forward some brilliant Anglo-Saxon, Celt, or Latin who, possessing an understanding that transcends race, religion, and tradition, can adopt the Eastern temperament at will. Such men were Marco Polo, the Venetian, and General Charles Gordon. Such a man is Thomas Edward Lawrence, the modern Arabian knight.

Fomenting Revolt in Arabia

How Lawrence Fanned the Sparks which Became Sweeping Fire in the Desert

THOMAS E. LAWRENCE

This installment carries Colonel Lawrence's narrative from the opening of his part in the Arab revolt to the capture of Akaba, which has been described by English critics as one of the most thrilling episodes in a thrilling personal story.

WHEN AT LAST we anchored in Jedda's outer harbor, off the white town hung between the blazing sky and its reflection in the mirage which swept and rolled over the wide lagoon, then the heat of Arabia came out like a drawn sword and struck us speechless. It was a midday of October of 1916; and the noon sun had, like moonlight, put to sleep the colors. There were only lights and shadows, the white houses and black gaps of streets: in front, the pallid lustre of the haze shimmering upon the inner harbor: behind, the dazzle of league after league of featureless sand, running up to an edge of low hills, faintly suggested in the far-away mist of heat.

EMIR FEISAL, KING OF IRAQ
The Arab leader whom Lawrence guided to victory over the Turks.

Just north of Jedda was a second group of black-white buildings, moving up and down like pistons in the mirage, as the ship rolled at anchor and the intermittent wind shifted the heat waves in the air.

Colonel Wilson, British representative with the new Arab state, had sent his launch to meet us; and we had to go ashore to learn the reality of the men levitating in that mirage. We walked past the white masonry of the still-building water gate, and through the oppressive alley of the food market on our way to the consulate. In the air, from the men to the dates and back to the meat, squadrons of flies like particles of dust danced up and down the sun-shafts which stabbed into the darkest corners of the booths through torn places in the wood and sackcloth awnings overhead. The atmosphere was like a bath.

We reached the consulate; and there in a shaded room with an open lattice behind him sat Wilson, prepared to welcome the sea breeze, which had lagged these last few days. He told us that Sherif Abdulla, second son of Hussein, Grand Sherif of Mecca, was just then entering the town. Ronald Storrs and myself had come down the Red Sea from Cairo to meet Abdulla. It was auspicious that we had arrived together.

Abdulla, on a white mare, came to us softly, with a bevy of richly armed slaves on foot about him, through the silent, respectful salutes of the town. He was

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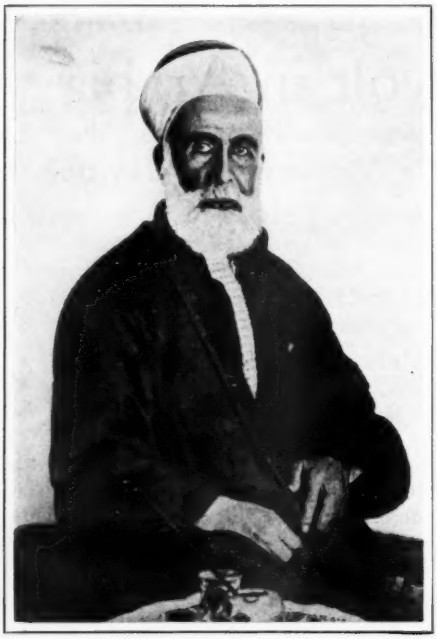


SHERIF HUSSEIN

Lineal descendant of Mohammed, he started the Arab revolt, captured Mecca, and became King of the Hejaz, reigning until some months ago when he was ousted by his old enemy, Ibn Saud, Sultan of Nejd.

flushed with his success at Taif, and happy. I was seeing him for the first time, while Storrs was an old friend, and on the best of terms; yet before long as they spoke together, I began to suspect him of a constant cheerfulness.

The sherif's rebellion had been unsatisfactory for the last few months (standing still, which, with an irregular war, was the prelude to disaster); and my suspicion was that its lack was leadership: not intellect, nor judgment, nor political wisdom, but the flame of enthusiasm that would set the desert on fire. My visit was mainly to find the yet unknown master-spirit of the affair, and measure his capacity to carry the revolt to the goal I had conceived for it.

Storrs brought me into the discussion by asking his views on the state of the campaign. Abdulla at once grew serious, and said that he wanted to urge upon the British their immediate and very personal concern in the matter, which he tabulated so: By our neglect to cut the Hejaz Railway, the Turks had been able to collect transport and supplies for the reënforcement of Medina. Feisal had been driven back from the town; and the enemy was preparing a mobile column of all arms for an advance on Rabigh. The Arabs in the hills across their road were by our neglect too weak in supplies, machine guns, and artillery to defend them long. Hussein Mabeurig, chief of the Rabigh Harb, had joined the Turks. If the Medina column advanced, the Harb would join it. It would only remain for his father to put himself at the head of his own people of Mecca, and die fighting before the Holy City.

At this moment the telephone rang: the Grand Sherif wanted to speak to Abdulla. He was told of the point our conversation had reached, and at once confirmed that he would so act in the extremity. The Turks would enter Mecca over his dead body. The telephone rang off; and Abdulla, smiling a little, asked, to prevent such a disaster, that a British brigade, if possible of Moslem troops, be kept at Suez, with transport to rush it to Rabigh as soon as the Turks debauched from Medina in their attack. What did we think of the proposal?

I thought that I might perhaps urge his opinions more powerfully if I was able to report on the Rabigh question in the light of my own knowledge of the position and local feeling. I would also like to see Feisal, and talk over with him his needs and the prospects of a prolonged defense of his hills by the tribesmen if we strengthened them materially. I would like to ride from Rabigh up the Sultani road towards Medina as far as Feisal's camp.

After much argument Lawrence finally obtained permission from the Arabs to make a short camel journey inland to the camp of Emir Feisal.

Hamra opened on our left. It seemed a village of about one hundred houses, buried in gardens among mounds of earth some twenty feet in height. We forded a

little stream, and went up a walled path between trees to the top of one of these mounds, where we made our camels kneel by the yard-gate of a long, low house. Tafas said something to a slave who stood there with silver-hilted sword in hand. He led me to an inner court, on whose further side, framed between the uprights of a black doorway, stood a white figure waiting tensely for me. I felt at first glance that this was the man I had come to Arabia to seek—the leader who would bring the Arab Revolt to full glory.

Feisal looked very tall and pillar-like, very slender, in his long white silk robes and his brown headcloth bound with a brilliant scarlet and gold cord. His eyelids were dropped; and his black beard and colorless face were like a mask against the strange, still watchfulness of his body. His hands were crossed in front of him on his dagger.

I greeted him. He made way for me into the room, and sat down on his carpet near the door. As my eyes grew accustomed to the shade, they saw that the little room held many silent figures, looking at me or at Feisal steadily. He remained staring down at his hands, which were twisting slowly about his dagger. At last he inquired softly how I had found the journey. I spoke of the heat, and he asked how long from Rabigh, commenting that I had ridden fast for the season.

"And do you like our place here in Wadi Safra?"

"Well; but it is far from Damascus."

The word had fallen like a sword in their midst. There was a quiver. Then everybody present stiffened where he sat, and held his breath for a silent minute. Some, perhaps, were dreaming of far-off success; others may have thought it a reflection on their late defeat. Feisal at length lifted his eyes, smiling at me, and said, "Praise be to God, there are Turks nearer to us than that." We all smiled with him and I rose and excused myself for the moment.

A few days with Emir Feisal convinced Lawrence that it might be possible to reorganize this rabble into an irregular force which would be of assistance to the British Army in Egypt and Sinai.

Feisal was announced with Maulud el Mukhlus, the Arab zealot of Tekrit, who, for rampant nationalism, had been twice degraded in the Turkish Army, and had spent an exile of two years in Nejd as a secretary with Ibn Rashid. He had commanded the Turkish cavalry before Shaiba, and had been taken by us there. As soon as he heard of the rebellion of the sherif he had volunteered for him, and had been the first regular officer to join Feisal. He was now nominally his A. D. C.

Bitterly he complained that they were in every way ill-equipped. This was the main cause of their present plight. They got thirty thousand pounds a month from the sherif, but little flour and rice, little barley, few rifles, insufficient ammunition, no machine guns, no mountain guns, no technical help, no information. I stopped Maulud there and said my coming was expressly to learn what they lacked and report it, but that I could work with them only if they would explain to me

EMIR FEISAL'S FAVORITE CHARGER
Feisal, third son of Hussein, was picked by Lawrence as the strongest leader of the Arabian revolt.

their general situation. Feisal agreed and began to sketch to me the history of their revolt from its absolute beginning.

The first rush on Medina had been a desperate business. The Arabs were ill-armed and short of ammunition, the Turks in great force. At the height of the crisis the Beni Ali broke; and the Arabs were thrust out beyond the walls. The Turks then opened fire on them with their artillery; and the Arabs, unused to this new arm, became terrified. The Ageyl and Ateiba got into safety and refused to move.

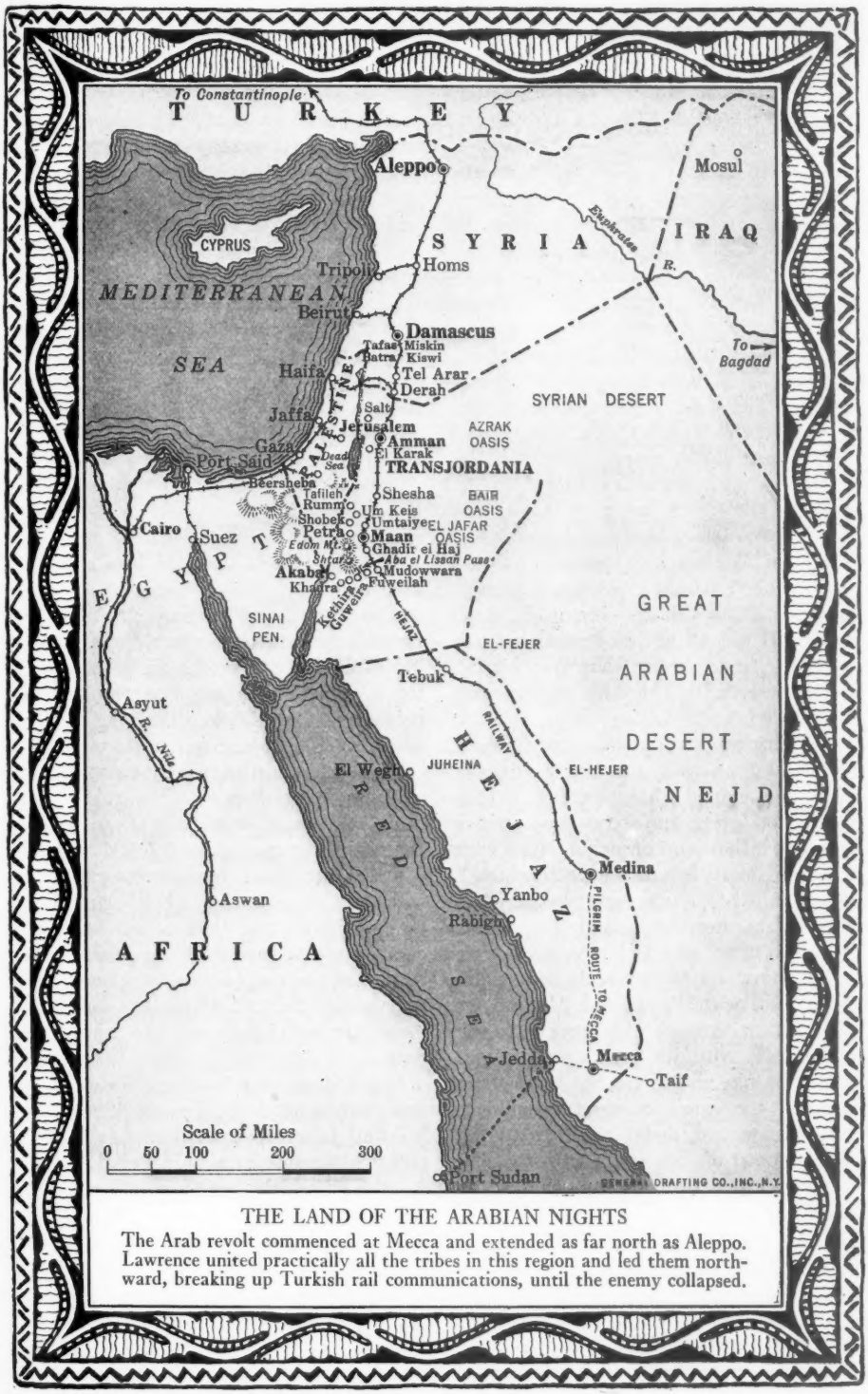
Sections of the Beni Ali tribesmen approached the Turkish command with an offer to surrender, if their villages were spared. Fakhri Pasha (the Turkish commander at Medina) played with them, and in the ensuing lull of hostilities surrounded the Awali suburb with his troops: whom suddenly he ordered to carry it by assault and to massacre every living thing within its walls. Hundreds of the inhabitants were raped or butchered, the houses fired, and living and dead alike thrown back into the flames. Fakhri and his men had served together and had learned the arts of both the slow and the fast kill upon the Armenians in the North.

This bitter taste of the Turkish mode of war sent a shock across Arabia; for the first rule of Arab war was that women were inviolable: the second, that the lives and honor of children too young to fight with men were to be spared: the third, that property impossible to carry off should be left undamaged. The Arabs with Feisal perceived that they were opposed to new customs, and fell back out of touch to gain time to readjust themselves.

So they fell back from the level plains about Medina into the hills where they rested, while Ali and Feisal sent messenger after messenger down to Rabigh, their seabase, to learn when fresh stores and money and arms might be expected. The revolt had begun haphazard, on their father's explicit orders, and the old man, too independent to take his sons into his full confidence, had not worked out with them any arrangements for prolonging it. So the reply was only a little food. Later some Japanese rifles, most of them broken, were received. No money was sent up at all: to take its place Feisal filled a decent chest with stones, had it locked and corded carefully, guarded on each daily march by his own slaves, and introduced meticulously into his tent each night. By such theatricals the brothers tried to hold a melting force.

At last Ali went down to Rabigh to inquire what was wrong with the organization. He found that the local chief had made up his mind that the Turks would be victorious. As the stores for the sherif were landed by the British he appropriated them and stored them away secretly in his own houses. Ali made a demonstration, and sent urgent messages for his half-brother, Zeid, to join him from Jedda with reënforcements. The chief, in fear, slipped off to the hills, an outlaw. The two sherifs took possession of his villages. In them they found great stores of arms, and food enough for their armies for a month. The temptation of a spell of leisured ease was too much for them: they settled down in Rabigh.

This left Feisal alone up country, and he soon found himself isolated, in a hollow situation, driven to depend upon his native resources. He bore it for a time, but in August took advantage of the visit of Colonel Wilson to the newly conquered Yanbo, to come down and give a full explanation of his urgent needs. Wilson was impressed with him and his story, and at once promised him a battery of mountain guns and some maxims, to be handled by men and officers of the Egyptian army garrison in the Sudan. The Arabs rejoiced when they came, and believed they were now equals of the Turk; but the four guns were twenty-year-old Krupps, with a range of only three thousand yards. However, they went forward with the mob and drove in the Turkish outposts, and then their supports, until Fakhri, becoming seriously alarmed, came down himself, inspected the front, and at once reënforced the threatened detachment at Bir Abbas to some three thousand strong. The Turks had field guns and howitzers with them, and the added advantage of high ground for observation.



THE LAND OF THE ARABIAN NIGHTS

The Arab revolt commenced at Mecca and extended as far north as Aleppo. Lawrence united practically all the tribes in this region and led them northward, breaking up Turkish rail communications, until the enemy collapsed.

They began to worry the Arabs by indirect fire, and nearly dropped a shell on Feisal's tent while all the head men were conferring within. The Egyptian gunners were asked to return the fire and smother the enemy guns. They had to plead that their weapons were useless, since they could not carry the nine thousand yards. They were derided; and the Arabs ran back again into the defiles.

I asked Feisal what his plans were now. He said that till Medina fell they were inevitably tied down there in Hejaz dancing to Fakhri's tune. In his opinion the Turks were aiming at the recapture of Mecca. The bulk of their strength was now in a mobile column, which they could move toward Rabigh by a choice of routes which kept the Arabs in constant alarm.

Meanwhile, here, as it seemed, was offered to our [the Allies'] hand, which had only to be big enough to take it, a prophet who, if veiled, would give cogent form to the idea behind the activity of the Arab revolt. It was all and more than we had hoped for, much more than our halting course deserved. The aim of my trip was fulfilled.

My duty was now to take the shortest road to Egypt with the news: and the knowledge gained that evening in the palm wood grew and blossomed in my mind into a thousand branches, laden with fruit and shady leaves, beneath which I sat and half-listened and saw visions, while the twilight deepened, and the night; until a line of slaves with lamps came down the winding paths between the palm trunks, and with Feisal and Maulud we walked back through the gardens to the little house, with its courts still full of waiting people, and to the hot inner room in which the familiars were assembled; and there we sat down together to the smoking bowl of rice and meat set upon the food-carpet for our supper by the slaves.

Next morning I was up early and out among Feisal's troops toward the side of Kheif, by myself, trying to feel the pulse of their opinions in a moment. Time was of the essence of my effort, for it was necessary to gain in ten days the impressions which would ordinarily have been the fruit of weeks of observing in my crab-fashion, that sideways-slipping affair of the senses. I believed in the Arab movement, and was confident before ever I came, that in it was the idea to tear Turkey to pieces; but others in Egypt lacked faith, and had been taught nothing intelligent of the Arabs in the field. By noting down something of the spirit of these romantics in the hills about the Holy Cities I might gain the sympathy of Cairo for the further measures necessary to help them.

The men received me cheerfully. Because of my khaki they took me for a Turk-trained officer who had deserted to them, and were profuse in good-humored but ghastly suggestions of how they should treat me. They were in wild spirits, shouting that the war might last ten years. It was the fattest time the hills had ever known.

The sherif was feeding not only the fighting men, but their families, and paying two pounds a month for a man, four for a camel. Nothing else would have performed the miracle of keeping a tribal army in the field for five months on end.

The actual contingents were continually shifting, in obedience to the rule of the flesh. A family would own a rifle, and the sons serve in turn for a few days each. Married men alternated between camp and wife, and sometimes a whole clan would become bored and take a rest. Feisal's eight thousand men were one in ten camel corps and the rest hill-men. They served only under their tribal sheikhs, and near home, arranging their own food and transport.

Blood feuds were nominally healed, and really suspended in the sherifian area: Bili and Juheina, Ateiba and Ageyl living and fighting side by side in Feisal's army. All the same, the members of one tribe were shy of those of another, and within the tribe no man would quite trust his neighbor. Each might be, usually was, whole-hearted against the Turk, but perhaps not quite to the point of failing to work off a family grudge upon a family enemy in the field.

THE GREAT ARABIAN DESERT

Through the narrow gorges of northwestern Arabia, where rock ridges tower thousands of feet above, Lawrence made many marches, raiding Turkish outposts and wrecking trains, tortured by summer's blinding sandstorms and blistering heat and winter's blizzards and freezing winds.

Their acquisitive recklessness made them keen on booty, and whetted them to tear up railways, plunder caravans, and steal camels; but they were too free-minded to endure command, or to fight in team. A man who could fight well by himself made generally a bad soldier, and these champions seemed to me no material for our drilling; but if we strengthened them by light automatic guns of the Lewis type, to be handled by themselves, they might be capable of holding their hills.

The Hejaz war was the fight of a rocky, mountainous, barren country (reënforced by a wild horde of mountaineers) against an enemy so enriched in equipment by the Germans as almost to have lost virtue for rough-and-tumble war. The hill belt was a paradise for snipers. The valleys, which were the only practicable roads, for miles and miles were not so much valleys as chasms or gorges, sometimes two hundred yards across, but sometimes only twenty, full of twists and turns, one thousand or four thousand feet deep, barren of cover, and flanked each side by pitiless granite, basalt and porphyry, not in polished slopes, but serrated and split and piled up in thousands of jagged heaps of fragments as hard as metal and nearly as sharp.

The sole disquieting feature was the very real success of the Turks in frightening the Arabs by artillery. The sound of a fired cannon sent every man within earshot behind cover. They thought weapons destructive in proportion to their noise. They were not afraid of bullets, nor indeed overmuch of dying; just the manner of death by shell-fire was unendurable. It seemed to me that their moral confidence was to be restored only by having guns, useful or useless, but noisy, on their side.

General Sir Gilbert Clayton, head of the British Intelligence Corps, knew that Lawrence could speak the language and understood the people, so on receiving his report, ordered him to return to Feisal in the hope that he might encourage the Arabs a little more and help keep the rebellion alive.

The sidar had telegraphed to London for certain regular officers competent to direct the Arab war. As I was starting thence up-country to visit Feisal again, news came in of a Turkish repulse. A reconnaissance of their cavalry and camel corps had been pushed too far into the hills and the Arabs had caught it and scattered it. So I made a happy start with my sponsor for the journey, Sherif Abd el Kerim.

The routine of our life in camp was simple. Just before daybreak the army imam used to utter an astounding call to prayer. His voice was harsh and very powerful, and we were effectually roused, whether we prayed or cursed. As soon as he ended, Feisal's imam cried gently and musically from just outside the tent. In a minute, one of Feisal's five slaves came around with sweetened coffee. Sugar for the first cup in the chill of dawn was considered fit. An hour or so later, the flap of Feisal's sleeping tent would be thrown back; his invitation to callers from the household. There would be four or five present; and after the morning's news a tray of breakfast would be carried in.

After breakfast we would play with bitter coffee and sweet tea in alternation, while Feisal's correspondence was dealt with by dictation to his secretaries. One of these was Faiz the adventurous; another was the imam, a sad-faced person made conspicuous in the army by the baggy umbrella hanging from his saddle bow. Occasionally a man was given private audience at this hour, but seldom; as the sleeping tent was strictly for the sherif's own use. It was an ordinary bell-tent, furnished with cigarettes, a camp-bed, a fairly good Kurd rug, a poor Shirazi, and the delightful old Baluch prayer carpet on which he prayed.

At about eight o'clock in the morning Feisal would buckle on his ceremonial dagger and walk across to the reception tent. He would sit down at the end of the tent facing the open side, and we with our backs against the wall, in a semicircle out from him. The slaves brought up the rear, and clustered round the open wall of the tent to control the besetting suppliants who lay on the sand in the tent-mouth, or beyond, waiting their turn. If possible, business was got through by noon, when the Emir liked to rise.

We of the household, and any guests, then reassembled in the living-tent; and Hejris and Salem carried in the luncheon tray, on which were as many dishes as circumstances permitted. Feisal was an inordinate smoker, but a very light eater, and he used to make-believe with his fingers or a spoon among the beans, lentils, spinach, rice, and sweet cakes, till he judged that we had had enough, when at a wave of his hand the tray would disappear, as other slaves walked forward to pour water for our fingers at the tent door.

Fat men, like Mohammed ibn Shefia, made a comic grievance of the Emir's quick and delicate meals, and would have food of their own prepared for them when they came away. After lunch we would talk a little, while sucking up two cups of coffee, and savoring two glasses full of syrup-like green tea. Then till two in the afternoon the curtain of the living-tent was down, signifying that Feisal was sleeping, or reading, or doing private business. Afterward he would sit again in the reception-tent till he had finished with all who wanted him. I never saw an Arab leave him dissatisfied or hurt—a tribute to his tact and to his memory; for he seemed never to halt for loss of a fact, nor to stumble over a relationship.

If there was time after second audience, he would walk with his friends. Between six and seven there was brought in the evening meal, to which all present in headquarters were called by the slaves. It resembled the lunch.

This meal ended our day, save for the stealthy offering by a bare-footed slave of a tray of tea-glasses at protracted intervals. Feisal did not sleep till very late, and never betrayed a wish to hasten our going. In the evening he relaxed as far as possible and avoided avoidable work. Very rarely he would play chess, with the unthinking directness of a fencer, and brilliantly. Sometimes, perhaps for my benefit, he told stories of what he had seen in Syria, and scraps of Turkish secret

history, or family affairs. I learned much of the men and parties in the Hejaz from his lips.

Suddenly Feisal asked me if I would wear Arab clothes like his own while in camp. I should find it better for my own part, since it was a comfortable dress in which to live Arab-fashion, as we must do. Besides, the tribesmen would then understand how to take me. The only wearers of khaki in their experience had been Turkish officers, before whom they took up an instinctive defense. If I wore Meccan clothes, they would behave to me as though I were really one of the leaders; and I might slip in and out of Feisal's tent without making a sensation which he had to explain away each time to strangers.

I agreed at once, very gladly. Hejris was pleased, too, and exercised his fancy in fitting me out in splendid white silk and gold-embroidered wedding garments which had been sent to Feisal lately by his great aunt in Mecca. I took a stroll in the new looseness of them round the palm-gardens, to accustom myself to their feel.

With two companions Lawrence went out on a recruiting expedition among the Bedouin tribes, setting them aflame with enthusiasm for the revolt in the desert, so that in operations around Yanbo and El Wegh they had 10,000 men. Soon Lawrence was notified of his relief as liaison officer between the British and Arabs, to be replaced by Colonel Newcombe, but he managed to remain with Feisal in the capacity of a grand visor—and his influence and power increased both politically and in the direction of military operations. The genius in him advised the Arabs against taking Medina, and by harassing the Turks he kept a large force on constant duty. But they had to be fed—and when the supply trains came in Lawrence would blow them up, thus procuring food and equipment for his Arabs. And the revolt spread and spread.

ARAB IRREGULARS STARTING ON A RAID

Lawrence organized groups of Bedouins into fast-moving and self-sufficient raiding parties which constantly harassed Turkish outposts and demolished railways and bridges.

The Arabs had passed from doubt to violent optimism, and were promising exemplary service. Feisal enrolled most of the Billi, who made him master of Arabia between the railway and the sea. He then sent the Juheina to Abdulla in Wadi Ais. He could now prepare to deal solemnly with the Hejaz Railway; but I begged him first to delay in Wegh and set marching an intense movement among the tribes beyond us, that in the future our revolt might be extended and the railway threatened from Tebuk (our present limit of influence) northward as far as Maan.

With his northern neighbors, the coastal Howeitat, he had already made a begin-

THE ARAB G. H. Q.

Emir Feisal, commander-in-chief, and his staff. Colonel Lawrence, the real chief, is seated next to the leader at the extreme right.

ning: but we now sent to the Beni Atiyeh, a stronger people to the northeast; the chief, Asi ibn Atiyeh, came in and swore allegiance. He gave us freedom of movement across his tribe's territory. Beyond lay various tribes owing obedience to Nuri Shaalan, the great Emir of the Ruwalla, who after the sherif and Ibn Saud and Ibn Rashid, was the fourth among the precarious princes of the desert. All feared and obeyed him. To use his roads we must have his countenance.

Fortunately, this was easy. Feisal had secured it years ago, and had retained it by interchange of gifts from Medina and Yanbo. His favor would open to us the Sirhan, a famous roadway, camping ground, and chain of water-holes, which in a series of linked depressions extended from Jauf, Nuri's capital, in the southeast, northward to Azrak, near Jebel Druse, in Syria.

It was the freedom of the Sirhan we needed to reach the tents of the Eastern Howeitat, those famous Abu Tayi, of whom Auda, the greatest fighting man in northern Arabia, was chief. Only by means of Auda abu Tayi could we swing the tribes from Maan to Akaba so violently in our favor that they would help us take Akaba and its hills from their Turkish garrisons: only with his active support could we venture to thrust out from Wegh on the long trek to Maan. Since our Yanbo days we had been longing for him and trying to win him to our cause.

We made a great step forward at Wegh; Ibn Zaal, his cousin and a war leader of the Abu Tayi, arrived on February 17th [1917]. He kissed Feisal's hand once for Auda and then once for himself, and sitting back, declared that he came from Auda to present his salutations and to ask for orders. Feisal, with policy, controlled his outward joy, and introduced him gravely to his blood enemies, the Jazi Howeitat. Ibn Zaal acknowledged them distantly. Later, we held great private conversations with him and dismissed him with rich gifts, richer promises, and Fiesal's own message to Auda that his mind would not be smooth till he had seen him face to face in Wegh.

Auda was an immense chivalrous name, but an unknown quantity to us, and in so vital a matter as Akaba we could not afford to make a mistake. He must come down that we might weigh him, and frame our future plans actually in his presence, and with his help.

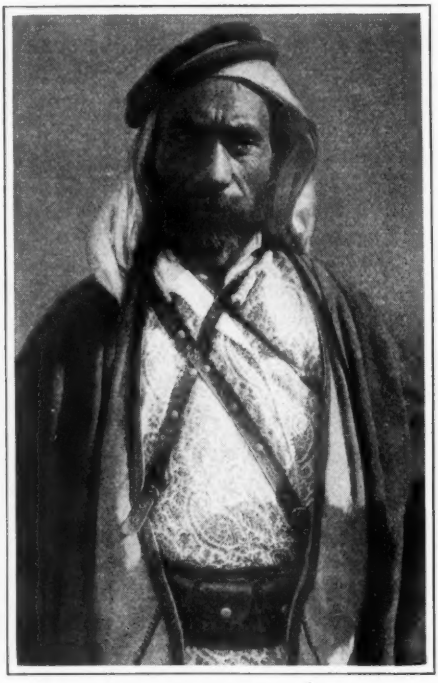
Except that all its events were happy, this day was not essentially unlike Feisal's every day. The rush of news made my diary fat. The roads to Wegh swarmed with envoys and volunteers and great sheikhs riding in to swear allegiance. The contagion of their constant passage made the lukewarm Billi ever more profitable to us. Feisal swore new adherents solemnly on the Koran between his hands, "to wait while he waited, march when he marched, to yield obedience to no Turk, to deal kindly with all who spoke Arabic (whether Bagdadi, Aleppine, Syrian, or pure-blooded), and to put independence above life, family, and goods."

He began to confront them at once, in his presence, with their tribal enemies, and to compose their feuds. An account of profit and loss would be struck between the parties, with Feisal modulating and interceding between them, and often paying the balance, or contributing toward it from his own funds, to hurry on the pact. The Bedu were odd people. For an Englishman, sojourning with them was unsatisfactory unless he had patience wide and deep as the sea. They were absolute slaves of their appetite, with no stamina of mind, drunkards for coffee, milk, or water, gluttons for stewed meat, shameless beggars of tobacco. Had the circumstances of their lives given them opportunity they would have been sheer sensualists. Their strength was the strength of men geographically beyond temptation: the poverty of Arabia made them simple, continent, enduring.

One afternoon Suleiman, the guest-master, hurried in and whispered to Feisal, who turned to me with shining eyes, trying to be calm, and said, "Auda is here." I shouted, "Auda abu Tayi?" and at that moment the tent-flap was drawn back before a deep voice which boomed salutations to Our Lord, the Commander of the Faithful. There entered a tall, strong figure, with a haggard face, passionate and tragic. This was Auda, and after him followed Mohammed, his son,

SHEIK AUDA AND HIS SON

Though the boy was only eleven he accompanied his father on enemy raids. Auda talked and boasted much, but as the leader of Lawrence's "shock troops" he astonished even the brave Arabs by his reckless daring and successful attacks.



A SHEIK OF ARABIA

Leader of his desert tribe, more often than not anything but a romantic figure—dirty, ignorant, lazy and poor, but a terror as a fighter and a brigand.

a child in looks, and only eleven years old in truth.

Feisal had sprung to his feet. Auda caught his hand and kissed it, and they drew aside a pace or two and looked at each other—a splendidly unlike pair, typical of much that was best in Arabia, Feisal the prophet, and Auda the warrior, each filling his part to perfection, and immediately understanding and liking the other. They sat down. Feisal introduced us one by one, and Auda with a measured word seemed to register each person.

Auda was very simply dressed, northern fashion, in white cotton, with a red Mosul head cloth. He might be over fifty, and his black hair was streaked with white; but he was still strong and straight, loosely built, spare, and as active as a much younger man.

Centuries ago the Howeitat came from Hejaz, and their nomad clans prided themselves on being true Bedu. Auda was their master type. His hospitality was sweeping; except to very hungry souls, inconvenient. His generosity kept him always poor, despite the profits of a hundred raids. He had married twenty-eight times, had been wounded thirteen times; whilst the battles he had provoked had seen all his tribesmen hurt and most of his relations killed. He himself had slain seventy-five men, Arabs, with his own hand in battle, and never a man except in battle. Of the number of dead Turks he could give no account; they did not enter the register. Auda raided as often as he had opportunity and as widely as he could. He had seen Aleppo, Basra, Wegh, and Wadi Dawasir on his expeditions; and was careful to be at enmity with nearly all tribes in the desert, that he might have proper scope for raids.

The British had put in temporary command at El Wegh Lieut.-Col. S. F. Newcombe, army railway builder. Several other British officers were assigned important duties and they soon became active in the Arab revolt. Newcombe played a meteoric part in it for seven months and initiated the methods of railway destruction which Lawrence afterward applied so effectively.

The long pause after Wegh fell had an important effect on my mind, for I was sent on detached duty and had solitude for thinking, and a remote point from which to regard our activities. Every effort was still directed against the Hejaz railway. Newcombe and Garland were near Muadhdham with Sherif Sharraf and Maulud. They had many Billi, the mule-mounted infantry, and guns and machine guns, and hoped to take the fort and the railway station there.

Newcombe meant then to move all Feisal's men forward very close to Medain Salih, and, by taking and holding a part of the line, to cut off Medina and compel its early surrender. Wilson was coming up to help in this operation, and Davenport would take as many of the Egyptian Army as he could transport, to reënforce the Arab attack.

PANORAMA OF AKABA

Once the home port of King Solomon's fleet, Akaba was chosen by the Turks as a base for an Egyptian invasion, a dream which Lawrence ended by the capture of the ancient seaport.

All this program was what I had believed necessary for the further progress of the Arab revolt when we took Wegh. I had planned and arranged some of it myself. But now, to my leisure, it seemed that not merely the details, but the essence of this plan was wrong. It therefore became my business to explain my changed ideas and, if possible, to persuade my chiefs to follow me into the new theory.

Our largest resources, the Bedouin on whom our war must be built, were unused to formal operations, but had assets of mobility, toughness, self-assurance, knowledge of the country, intelligent courage. With them dispersal was strength. Consequently, we must extend our front to its maximum, to impose on the Turks the longest possible passive defense, since that was, materially, their most costly form of war. Our aim was to seek the enemy's weakest material link and bear only on that till time made their whole length fail. Our duty was to attain our end with the greatest economy of life, since life was more precious to us than money or time. We could develop a highly mobile, highly equipped striking force of the smallest size, and use it successively at distributed points of the Turkish line, to make them strengthen their posts beyond the defensive minimum of twenty men. This would be a short cut to success.

In detail I criticized the ruling scheme. To hold a middle point of the railway would be expensive, for the holding force might be threatened from each side. The mixture of Egyptian troops with tribesmen was a moral weakness. If there were professional soldiers present, the Bedouin would stand aside and watch them work, glad to be excused the leading part. Jealousy, superadded to inefficiency, would be the outcome. Further, the Billi country was very dry, and the maintenance of a large force up by the line technically difficult.

Of all the strategic places along the west coast of Arabia north of Aden, the most important from a military standpoint was the seaport of Akaba, held by the Turks. They had maintained a large garrison there

because they intended to wrest Egypt from the British and because it was essential to the security of the Hejaz Railway. Lawrence planned to capture Akaba and make it the base for an Arab invasion of Syria.

Neither my general reasoning, however, nor my particular objections had much weight. The plans were made, and the preparations advanced. Every one was too busy with his own work to give me specific authority to launch out on mine. All I gained was a hearing, and a qualified admission that my counter-offensive might be a useful diversion. I was working out with Auda abu Tayi a march to the Howeitat in their spring pastures of the Syrian desert. From them we might raise a mobile camel-force, and rush Akaba from the eastward without guns or machine guns. The eastern was the unguarded side, the line of least resistance, the easiest for us. Our march would be an extreme example of a turning movement, since it involved a desert journey of 600 miles to capture a trench within gun fire of our ships; but there was no practicable alternative. Auda thought all things possible with dynamite and money, and that the smaller clans about Akaba would join us.

SHEIK AUDA ABU TAYI

The fighting leader of the Howeitat, who guided Lawrence on his 600-mile recruiting campaign which ended at Akaba.

Feisal, who was already in touch with them, also believed that they would help if we won a preliminary success up by Maan and then moved in force against the port. The Navy raided it while we were thinking, and their captured Turks gave us such useful information that I became eager to be off at once. By May 9, 1917, all things were ready and in the glare of the mid-afternoon we left Feisal's tent, his good wishes sounding after us from the hill-top.

Auda and his kinsmen were with us; also Nesib el Bekri, the politic Damascene, to represent Feisal to the villagers of Syria. Nesib had brains and position, and he chose Zeki, a Syrian officer, for his companion. For escort we had thirty-five Ageyl under Ibn Dgheithir. Feisal had made up a purse of twenty thousand pounds in gold—all he could afford and more than we had asked for—to pay the wages of the new men we hoped to enroll and to make such advances as should stimulate the Howeitat to swiftness.

The baggage camels, weak with the cursed mange of Wegh, moved slowly, grazing all day as they went. We riders, light-mounted, might have passed them easily; but Auda, who was regulating our marches, forbade, because of the difficulties in front for which our animals would need all the fitness we could conserve in them. The summer sun in this country of white sand behind Wegh could dazzle the eyes cruelly, and the bare rocks each side our path threw off waves of heat which made our heads ache and swim.

In the morning we rode at five. Our valley pinched together, and we went round a sharp spur, ascending steeply. The track became a bad goat path, zigzagging up a hillside too precipitous to climb except on all fours. We dropped off our camels and led them by the headstalls, Soon we had to help each other, a man urging the camels from behind, another pulling them from in front, encouraging them over the worst places, adjusting their loads to ease them. Parts of the track were dangerous, where rocks bulged out and narrowed it, so that the near half of the load grazed and forced the animal to the cliff edge. We had to repack the food and explosives; and in spite of our care,

lost two of our feeble camels in the pass. The Howeitat killed them where they lay broken, stabbing a keen dagger into the throat-artery near the chest. They were at once cut up and shared out as meat.

Our heavy camels marched over the valley, the line, and the farther flat, till sheltered in the sand and rock mouths of the country beyond the railway. Meanwhile the Ageyl fixed gun-cotton or gelatine charges to as many of the rails as we had time to reach, and began, in proper order, to light the fuses, filling the hollow valley with the echoes of repeated bursts.

Auda had not before known dynamite, and with a child's first pleasure was moved to a rush of hasty poetry on its powerful glory. We cut three telegraph wires, and fastened the free ends to the saddles of six riding camels of the Howeitat. The astonished team struggled far into the eastern valleys with the growing weight of twanging, tangling wire and the bursting poles dragging after them. At last they could no longer move. So we cut them loose and rode in the falling dusk laughing after the caravan.

GENERAL FAKHRI PASHA
The Turkish commander who held Medina long after other Ottoman strongholds had capitulated.

The Fejr Bedouin, whose property it was, called our plain El Houl because it was desolate; and to-day we rode without seeing signs of life; no tracks of gazelle, no lizards, no burrowing of rats, not even any birds. We ourselves felt tiny in it. There was a breathless wind, with the furnace taste sometimes known in Egypt when a *khamsin* came; and as the day went on and the sun rose in the sky it grew stronger, more filled with the dust of the Nefudh, the great sand desert of northern Arabia, close by us over there, but invisible through the haze. By noon it blew a half-gale, so dry that our shriveled lips cracked open, and the skin of our faces chapped; while our eyelids, gone granular, seemed to creep back and bare our shrinking eyes.

Some days later, Lawrence following his custom of riding back and forth the length of his caravan, found one of his servants, Gasim, missing, though his camel was marching with the rest.

Without saying anything I turned my unwilling camel around, and forced her, grunting and moaning for her camel friends, back past the long line of men, and past the baggage into the emptiness behind. My temper was very unheroic, for I was furious with my other servants, with my own play-acting as a Bedouin, and most of all with Gasim, a gap-toothed, grumbling fellow, skrimshank in all our marches, bad-tempered, suspicious, brutal, a man whose engagement I regretted, and of whom I had promised to rid myself as soon as we reached a discharging place. It seemed absurd that I should peril my weight in the Arab adventure for a single worthless man.

I had been noting our direction all these days with my oil compass, and hoped, by its aid, to return nearly to our starting place, seventeen miles away. I had ridden about an hour and a half, easily, for the following breeze had let me wipe the crust from my red eyes and look forward almost without pain: when I saw a figure, or large bush, or at least something black ahead of me. The shifting mirage disguised height or distance; but this thing seemed moving, a little east of our course. On chance I turned my camel's head that way, and in a few minutes saw that it was Gasim.

When I called he stood confusedly; I rode up and saw that he was nearly blinded and silly, standing there with his arms held out to me, and his black mouth gaping open. The Ageyl had put our last water in my skin, and this he spilled madly over his face and breast, in haste to drink. He stopped babbling, and began to wail out his sorrows. I sat him, pillion, on the camel's rump, then stirred her up and mounted.

On his way back to the caravan Lawrence met Auda and two others who had turned back to find him and guide him over the trackless waste, virtually impassable with shifting sand and wind. It was by such deeds that Lawrence, the Christian, endeared himself to these desert Moslems and won their loyal support of his leadership. Nearly three weeks elapsed before the caravan arrived in the country of Auda's people, the Howeitat.

Our march was prosperously over. We had found the Howeitat: our men were in excellent fettle: we had our gold and our explosives still intact. There was agreement that we first should present six thousand pounds to Nuri Shaalan, by whose sufferance we were in Sirhan. We wanted from him liberty to stay while enrolling and preparing our fighting men: and when we moved off we wanted him to look after their families, tents, and herds. These were great matters. It was determined that Auda should ride to Nuri on embassy, because they were friends. Meanwhile, we would stay with Ali abu Fitna, moving gently northward with him toward Nebk, where Auda would tell all the Abu Tayi to collect. So we ladled six bags of gold into Auda's saddlebags; and off he went.

We feasted on the first day once, on the second twice, on the third twice; at Isawiya: and then, on the 30th of May, we saddled and rode on. The Abu Tayi struck camp when we struck, and journeyed at our side, and camped around us, so to-day for the first time I was spectator from the midst of an Arab tribe, and actor in the routine of its march.

The plague of snakes which had been with us since our first entry into Sirhan to-day rose to memorable height, and became a terror. In ordinary times, so the Arabs said, snakes were little worse here than elsewhere by water in the desert: but this year the valley seemed creeping with horned vipers and puff-adders, cobras and black snakes. By night movement was dangerous; and at last we found it necessary to walk with sticks, beating the bushes each side while we stepped warily through on bare feet.

A strange thing was the snakes' habit, at night, of lying beside us, probably for warmth, under or on the blanket. When we learned this our rising was with infinite care, and the first up would search round his fellows with a stick till he could pronounce them unencumbered. Our party of fifty men killed perhaps twenty snakes daily; at last they got so on our nerves that the boldest of us feared to touch ground; while those who, like myself, had a shuddering horror of all reptiles, longed that our stay in Sirhan might end.

We were very weary of Sirhan. The landscape was of a hopelessness and sadness deeper than all the open deserts we had crossed. There was something sinister, something actively evil in this snake-devoted Sirhan, proliferant of salt water, barren palms, and bushes which served neither for grazing nor for firewood.

Auda rejoined the party at Ageila, where the neighboring tribes swarmed into camp to join the Arab patriots and the blond prince of Mecca.

Affairs looked well, and we set three men to make coffee for the visitors who came in to Sherif Nasir one by one or group by group, swearing all allegiance to Feisal and to the Arab Movement, in the Wegh formula; and promising to obey Nasir, and to follow after him with their contingents. Besides their formal presents, each new party deposited on our carpet their privy, accidental gift of lice; and long before sunset Nasir and I were in a fever, with relay after relay of irritation. Auda had a stiff arm, and so could not scratch all of himself, but experience had

taught him a way of thrusting a cross-headed camel-stick up his left sleeve and turning it round and round inside against his ribs, which method seemed to relieve his itch more than our claws did ours.

We were now five weeks out from Wegh; we had spent nearly all the money we had brought with us; we had eaten all the Howeitat sheep; we had rested or replaced all our old camels; nothing hindered the start [in the general direction of the main objective, Akaba]. Our present party totalled more than five hundred strong; and the sight of this jolly mob of hardy, confident northerners chasing gazelle wildly over the face of the desert, took from me momentarily all sorry apprehension as to the issue of our enterprise. We set out again on June 19, 1917.

Several days out Auda invited Lawrence to ride ahead with him to Bair, where a son, killed in a feud, lay buried. Approaching the graves, they were surprised to see smoke rising from the wells, the only source of water within fifty miles.

The ground was torn and blackened as if by an explosion; and when we looked down the well-shaft we saw its steyning stripped and split, and many blocks thrown down the bore half-choking it and the water in the bottom. I sniffed the air and thought the smell was dynamite. Auda ran to the next well, in the bed of the valley below the graves. That, too, was ragged about the head and choked with fallen stones. We walked across the valley to the third—the Ben Sakhr well. It was only a crater of chalk. Zaal arrived, grave at sight of the disaster. We explored the ruined khan, in which were night-old traces of perhaps a hundred horse. There was a fourth well, north of the ruins, about whose lip the turf smoldered. An Ageyli brought us an empty case of Nobel's gelignite, evidently the explosive which the Turks had used.

After a close inspection Lawrence found that the Turks had bungled their job. Two charges had been placed in the wells, one at the top and the other far down inside. He discovered that these second charges had not been exploded, so was able to salvage thirty pounds of gelignite and in a few hours have two wells supplying water.

We determined to stay a week in Bair, to discover the condition of the Jafar wells and to procure food. We sent a man to Jafar. We prepared a little caravan of pack-camels with Howeitat brands and sent them across the line to Tafileh with three or four obscure clansmen—people who would never be suspected of association with us. They would buy all the

A DESERT APOLLO

The young Bedouins, conceited as any dandies of the western world, were ready to follow the brave English sherif anywhere, though he often led them straight against the muzzles of Turkish guns.

flour they could and bring it back to us in five or six days' time. As for the tribes about the Akaba road, we wanted their active help against the Turks to carry out the provisional plan we had made at Wegh. Our idea was to advance suddenly from El Jafar, to cross the railway-line, and to crown the great pass—Nagb el Shtar—down which the road dipped from the Maan road to the red Guweira plain. To hold this pass we should have to capture Aba el Lissan, the large spring at its head, about sixteen miles from Maan; but the garrison was small, and we hoped to overrun it with a rush. We would then be astride the road, whose posts at the end of the week should fall from hunger, though probably before that the hill tribes, hearing of our successful beginning, would join us to wipe them out.

The crux of my plan was the attack on Aba el Lissan, lest the force in Maan have time to sally out, relieve it, and drive us off the head of Shtar. If, as at present, they were only a battalion, they would hardly dare move; and should they let it fall while waiting for reënforcements to arrive, Akaba would surrender to us and we should be based on the sea.

When the expedition arrived at Jafar the well was found to have been dynamited, but as at Bair only the upper stones had fallen in, locked and formed a roof over the water. It was easily cleaned out, and Lawrence sent out a detachment of Arabs to take Fuweilah, a blockhouse at the head of the pass of Aba el Lissan.

The halt was not unpleasant, for our position had its comic side. We were within sight of Maan, during those minutes of the day in which the mirage did not make eyes and glasses useless; and yet we strolled about admiring our new well-lip in complete security, because the Turkish garrison believed water impossible here or at Bair and were hugging the pleasant idea that we were now desperately engaged with their cavalry in Sirhan. It was never easy for us to keep our movements secret, as we lived by preaching to the local people, and the unconvinced would tell the Turks. Our long march into the Sirhan was known to the enemy.

We sat in Jafar meanwhile, waiting to hear the fortune of the attack. I hid under some bushes near the well for hours, against the heat, very lazy, pretending to be asleep, the wide silk sleeves of my pillow-arm drawn over my face as a veil against the flies. Auda sat up and talked like a river, telling his best stories in great form. At last I reproved him with a smile, for talking too much and doing too little.

In the following dawn a tired horseman rode into our camp with news that the Dhumaniyeh (our attacking party) had fired on the Fuweilah post the afternoon before. The surprise had not been quite complete; the Turks manned their dry stone breastworks and drove them off. The crestfallen Arabs drew back into cover, and the enemy, believing it only an ordinary tribal affray, had made a mounted sortie upon the nearest encampment. One old man, six women, and seven children were its only occupants. In their anger at finding nothing actively hostile or able-bodied, the troopers smashed up the camp and cut the throats of its helpless ones.

The Dhumaniyeh on the hilltops heard and saw nothing till it was too late; but then, in their fury, they dashed down across the return road of the murderers and cut them off almost to the last man. To complete their vengeance they assaulted the now weakly garrisoned fort, carried it in the first fierceness of their rush, and took no prisoners.

We saddled and within ten minutes had loaded and marched for Ghadir el Haj, the first railway station south of Maan, on our direct road for Aba el Lissan. Simultaneously I detached a small party to cross the railway just above Maan and create a diversion on that side. Especially they were to threaten the great herds of sick camels, casualties of the Palestine front, which the Turks pastured in the Shobek plains.

At this point Lawrence, the untrained and undisciplined desk soldier, displayed the sheer military genius which was to make

LAWRENCE'S FAITHFUL COMRADES

Bedouins, inhabitants of the desert, scornful of Arabs living in the towns, living on little and wanting for nothing; ever fighting for possession of the water-holes; gaining a precarious living by raiding their neighbors and robbing pilgrims.

him one of the outstanding and most romantic figures of the Great War. Here he began to direct the Arabian campaign into a series of brilliant dashes against Turkish garrisons which was to cause the final collapse of their power in the Near East.

I calculated that the news of their Fuweilah disaster would not have reached Maan till the morning, and that they could not drive in these camels and fit out a relief expedition before nightfall; and if we were then attacking the line at Ghadir el Haj, they would probably divert the relief thither, and so let us move on Akaba unmolested. With this hope we rode steadily through the flowing mirage, till afternoon, when we descended on the line; and, having delivered a long stretch of it from guards and patrols, began on the many bridges of the captured section. The little garrison of Ghadir el Haj sallied out with the valor of ignorance, but the heat-haze blinded them and we drove them off with loss.

They were on the telegraph, and would notify Maan, which beside, could not fail to hear the repeated thuds of our explosions. It was our aim to bring the enemy down upon us in the night, or rather down here, where they would find no people but many broken bridges, for we worked fast and did great damage. The drainage holes in the spandrils held from three to five pounds of gelatine each. We, firing our mines by short fuses, brought down the arch, shattered the pier, and stripped the side walls, in no more than six minutes' work. So we ruined ten bridges and many rails, and finished our explosive.

After dusk, when our departure could not be seen, we rode five miles westward of the line, to cover. There we made fires and baked bread. Our meal, however, was not cooked, before three horsemen cantered up to report that a long column of new troops—infantry and guns—had just appeared at Aba el Lissan from Maan. The Dhumaniyeh, disorganized with victory, had had to abandon their ground without fighting. They were at Batra waiting for us. We had lost Aba el

Lissan, the blockhouse, the pass, the command of the Akaba road: without a shot being fired.

We learned afterward that this unwelcome and unwonted vigor on the part of the Turks was accident. A relief battalion had reached Maan that very day. The news of the Arab demonstration against Fuweilah arrived simultaneously, and the battalion, which happened to be formed up ready with its transport to march to barracks, was hurriedly strengthened by a section of pack artillery and some mounted men, and moved to rescue the post.

Such news shook us into quick life. We threw our baggage across our camels and set out over the rolling downs of this end of the tableland of Syria. Our hot bread was in our hands, and as we ate, there mingled with it the taste of the dust from our large force crossing the valley bottoms. We rode all night, and when dawn came were dismounting on the crest of the hills between Batra and Aba el Lissan, with a wonderful view westward over the green and gold Guweira plain, and beyond it to the ruddy mountains hiding Akaba and the sea.

For twelve hours in the blistering July heat Lawrence and his Bedouin hosts sniped at the Turks. Had they possessed the necessary courageous leaders the well-trained enemy troops could have cut their way through the thin Arabian line, but this they failed to do.

It was hotter than ever before I had felt it in Arabia. Some of the tough tribesmen broke under the cruelty of the sun, and crawled or had to be thrown under rocks to recover in their shade. We ran up and down to supply our lack of numbers by mobility. The hillsides were steep, and exhausted our breath, and the grass twined like little hands about our ankles as we ran, and plucked us back. The sharp reefs of limestone tore our feet, and long before evening the more energetic men were leaving a rusty print upon the ground with every stride.

Our rifles grew so hot with sun and shooting that they seared our hands; and we had to be grudging of our rounds, considering every shot and spending great pains to make it sure. The rocks on which we flung ourselves for aim were burning, so that they scorched our breasts and arms, from which later the skin drew off in ragged sheets. The present smart made us thirst. Yet even water was rare with us; we could not afford to fetch enough from Batra, and if all could not drink, it was better that none should.

Just after noon I had a heat-stroke, or so pretended, for I was dead weary of it all, and cared no longer how it went. So I crept into a hollow where there was a trickle of thick water in a muddy cup of the hills, to suck some moisture off its dirt through the filter of my sleeve. Nasir joined me, panting like a winded animal, with his cracked and bleeding lips shrunk apart in his distress.

Old Auda appeared, striding powerfully, his eyes bloodshot and staring, his knotty face working with excitement. He grinned with malice when he saw us lying there, spread out to find coolness under the bank, and croaked at me harshly, "Well, how is it with the Howeitat? All talk and no work?"

"By God, indeed!" spat I back again, for I was angry with every one and with myself, "they shoot a lot and hit a little!" Auda almost pale with rage, and trembling, tore his headcloth off and threw it on the ground beside me. Then he ran back up the hill like a madman, shouting to the men in his dreadful strained and rustling voice. They came together to him, and after a moment scattered away down-hill. I feared things were going wrong, and struggled to where he stood alone on the hilltop, glaring at the enemy: but all he would say to me was, "Get your camel if you want to see the old man's work!"

All our four hundred camel men were collected. We rode to their head. I asked where the horsemen had gone. "With Auda there." The shimt pointed over the ridge to the next valley above us. I kicked my camel furiously to the edge of the crest, to see our fifty horsemen coming down the last slope into the main

valley like a run-away, at full gallop, shooting from the saddle. Two or three went down, the rest thundered forward at marvelous speed, and the Turkish infantry, huddled together under the cliff, ready to cut their desperate way out toward Maan in the first dusk, began to sway in and out, and finally broke before the rush, adding their flight to Auda's charge. We plunged our camels over the hill and down toward the head of the fleeing enemy.

Lawrence at the head of his four hundred camel-mounted Bedouins charged into the demoralized Turks and for twenty minutes a thousand Turks and Arabs were mixed together in a wild, frenzied mass, all shooting madly. In the charge Lawrence accidentally shot his own camel through the head with his automatic and was tossed out in front of it while his followers rode madly over him. The battle ended in a massacre.

ARABIAN KNIGHTS

Lawrence kept them supplied with firearms and ammunition. Like children with toys they banged at birds, animals, and even friendly armored cars at every opportunity.

Auda was wildly pleased with the fight, and he held up his shattered field-glasses, his pierced pistol-holster, and his leather sword scabbard cut to ribbons. He had been the target of a volley which had killed his mare under him, but the six bullets through his clothes had left him scathless.

To an Arab an essential part of the triumph of victory was to wear the clothes of an enemy; and next day we saw our force transformed (as to the upper half) into a Turkish force, each man in a soldier's tunic. In the end our little army was ready. We had been kind to one of the captured officers and him we persuaded to be our Turkish scribe to the commandants of Guweira, Kethira, and Khadra—the three posts between us and Akaba—telling them that if our blood was not hot we took prisoners, and that prompt surrender would ensure their safe delivery to the prisoner's base in Egypt.

The Arabs wanted to kill all prisoners in retaliation for the Turkish atrocities against their women and children, and the death of Sheikh Belgawiya of Kerak, a leader whom the Turks had harnessed between four mules and torn limb from limb. But Lawrence said: "No." He wanted the Turks to learn that the Arabs treated their prisoners well, in order that the Turks might be persuaded to surrender more quickly.

Shtar hillside swooped away below us for hundreds and hundreds of feet, in curves like bastions, against which summer morning clouds were breaking; and from its foot opened the new earth of the Guweira plain. Guweira was a map of pink sand, brushed over with streaks of water courses, in a mantle of scrub; and out of this towered islands and cliffs of glowing sandstone, wind-scarped and rain-furrowed, tinted celestially by the early sun.

THE SHORELINE NEAR AKABA

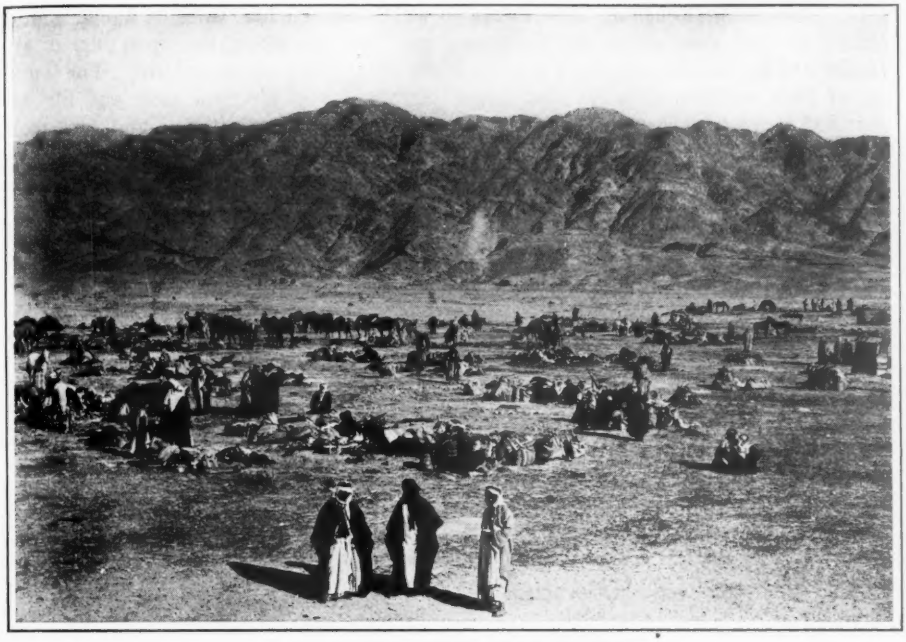
As the chief base for the Arabian army, constantly visited by English ships bringing food, guns, ammunition and armored cars, the ancient port on the Gulf of Akaba awoke from centuries of slumber.

After days of travel on the plateau in prison valleys to meet this brink of freedom was a rewarding vision. We walked down the whole zigzag pass of Shtar, to feel its excellence, for on our camels we rocked too much with sleep to dare see anything.

At the bottom the animals found a matted thorn which gave their jaws pleasure; we in front made a halt, rolled on to soft sand as a couch, and incontinently slept. Auda came. We pleaded that it was for mercy upon our broken prisoners. He replied that they alone would die of exhaustion if we rode, but if we dallied, both parties might die, for truly there was now little water and no food. However, we could not help it, and stopped that night short of Guweira after only fifteen miles.

At Guweira lay Sheikh ibn Jad, balancing his policy to come down with the stronger: and to-day we were the stronger, and the old fox was ours. He met us with honeyed speeches. The 120 Turks of the garrison were his prisoners: we agreed with him to carry them at his leisure and their ease to Akaba. Time pressed us for we were hungry, and Akaba was still far ahead behind two defenses. The nearer post, Kethira, stubbornly refused parley with our flags. Their cliff commanded the valley—a strong place which it might be costly to take. We assigned the honor, in irony, to Ibn Jad and his unwearied men, advising him to try it after dark. He shrank, made difficulties, pleaded the full moon: but we cut hardly into this excuse, promising that to-night for awhile there should be no moon. By my diary there was an eclipse. Duly it came, and the Arabs forced the post without loss, while the superstitious soldiers were firing rifles and clanging copper pots to rescue the threatened satellite.

The narrows of Wadi Itm increased in intricate ruggedness as we penetrated deeper. Below Kethira we found Turkish post after Turkish post empty. Their men had been drawn in to Khadra, the entrenched position which covered Akaba



A BEDOUIN CAMP NEAR AKABA

Following the successful capture of Akaba, the Arab revolt spread rapidly. The eloquence of Lawrence healed old feuds and welded the desert hordes into a formidable army.

so well against a landing from the sea. Unfortunately for them, the enemy had never imagined an attack from the interior, and of all their great works not one trench or post faced inland. Our advance from so new a direction threw them into panic.

In the afternoon we were in contact with this main position, and heard from the local Arabs that the subsidiary posts about Akaba had been called in or reduced so that only a last three hundred men barred us from the sea. We dismounted for a council, to hear that the enemy were resisting firmly, in bomb-proof trenches, with a new artesian well. Only it was rumored that they had little food. No more had we.

Lawrence had marched 600 miles from El Wegh in the south, with but two months' rations. After giving a part of his supplies to the captured Turks, the food situation became critical. Nevertheless, the half-starved Arab army, led by this youngster, continued through the jagged, barren mountains that bite the west Arabian sky. He called the chiefs together in conference and there was much argument as to how to proceed.

Our numbers had swollen double. So thickly did the men crowd in the narrow space, and press about us, that we broke up our council twice or thrice, partly because it was not good that they should overhear us wrangling, partly because in the sweltering confinement our unwashed smells offended us. We sent the Turks summonses, first by white flag, and then by Turkish prisoners, but they shot at both. This inflamed our Bedouin, and, while we were yet deliberating, a sudden wave of them burst up on the rocks and sent a hail of bullets spattering against the enemy. Nasir ran out barefoot to stop them, but after ten steps on the burning ground screeched for sandals, while I crouched in my atom of shadow, too wearied of these men (whose minds all wore my livery) to care who regulated their febrile impulses.

Two thousand years ago the Romans constructed a stone dam across the valley at Khadra and behind this ruin the Turks had massed their artillery. By the time Lawrence had brought his men in front of it all the neighboring tribes had heard of his recent victories and now they came scampering across the lava mountains by the hundreds to join the attacking force.

We had a third try to communicate with the Turks by means of a little conscript, who said he understood how to do it. We walked down close to the trenches with him, and sent in for an officer to speak with us. After some hesitation this was achieved, and we explained the situation on the road behind us; our growing forces, and our short control over their tempers. The upshot was that they promised to surrender at daylight. So we had another sleep (an event rare enough to chronicle) in spite of our thirst.

Next day at dawn fighting broke out on all sides, for hundreds of hill-men, again doubling our number, had come in the night, and not knowing the arrangement, began shooting at the Turks, who defended themselves. Nasir went out, with Ibn Dgheithir and his Ageyl, marching in fours, down the open bed of the valley. Our men ceased fire. The Turks then stopped, for their rank and file had no more fight in them and no more food, and thought we were well supplied. So the surrender went off quietly after all.

We sat down to watch our men streaming past. For months Akaba had been the horizon of our minds, the goal; we had no thought, we had refused thought, of anything beside. Hunger called us out of our trance. We had now seven hundred prisoners in addition to our own five hundred men and two thousand expectant allies. We had not any money (or, indeed, a market), and the last meal had been two days ago. In our riding camels we possessed meat enough for six weeks, but it was a poor diet, and a dear diet, indulgence in which would bring future immobility upon us. Supper [on the camels killed in the fight] taught us the urgent need to send news over the 150 desert miles to the British at Suez for a relief-ship. I decided to go across myself with a party of eight, mostly Howeitat, on the best camels in the force.

Lawrence—The Master Train Wrecker

In the next number of WORLD'S WORK Colonel Lawrence describes vividly how, after his capture of Akaba, he first met General Allenby, the new commander of the British armies in the Near East; how time and again he led his Arabs against the Turks, through red hills gashed into gorges where armies might be lost and squadrons of airplanes could have wheeled in formation under the overha nging cliffs. He tells how he became the master train-wrecker, champion of all the destroyers in this terrible form of destruction; how he blew up the railways which linked together the Turkish forces, so that they offered a fortune for him, dead or alive; how Allenby in recognition of his unparalleled services made him a staff officer for the ceremonies on the day he entered Jerusalem. Lawrence's story grows more thrilling as the Arab Revolt progresses and the Turks, embittered by successive defeats, try frantically to end the career of the "blond prince of Mecca."

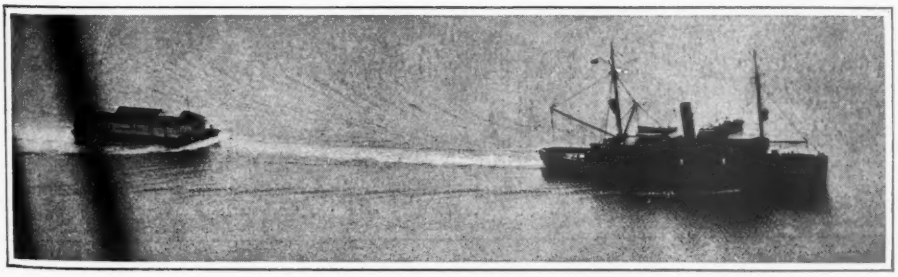
The Aviator Maps Our Last Frontier

Alaska Yields Its Golden Secrets to an Airplane Expedition

LIEUTENANT BEN H. WYATT, U. S. N.
CHIEF OF THE ALASKAN AERIAL SURVEY EXPEDITION

Locked by mountains and glaciers, the secrets of our rich empire in Alaska have been learned slowly by the old methods—and, finally, this last year the United States Government decided to try the airplane. After the expedition was finished Secretary Jardine of the Department of Agriculture wrote: "I am informed that we could not have hoped to cover in ten seasons the area which the aërial survey party was able to cover in three months."

THE DAY was gray, the clouds were low, a dead calm prevailed, when on the morning of May 24, 1926, three heavily laden planes attached to the Aircraft Squadrons, Battle Fleet, took the air. Swinging over the Naval Air Station at San Diego, the planes, with their powerful motors thrumming a song, turned, assumed a cruising formation, and headed northward, Alaska bound. They



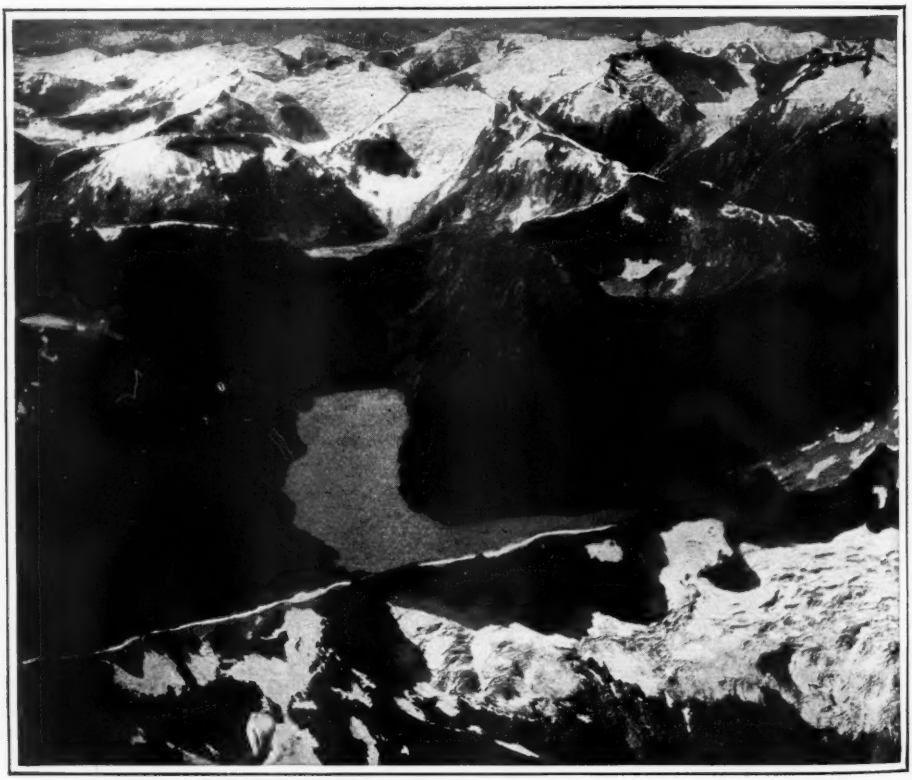
THE U. S. S. "GANNET" TOWING "THE COVERED BARGE"
The planes, tender, and barge constituted a self-supporting as well as mobile seagoing unit.

were off, embarked on a photographic mission, the equal of which had not, as far as is known, ever been attempted by the air forces of any nation—to survey from the air America's last frontier, the hitherto unexplored and almost inaccessible islands and portions of the mainland of southeastern Alaska.

Alaska has long been famed in fiction and picture as the land of ice and snow —the land which has for ages stood aloof and ignored the pleas, the struggles, and the conquering aspirations of man. Its towering peaks, covered with the snows of ages, have stood since time immemorial forbidding man and his science the right to conquer. Men have aspired, and their bones have been left as a warning—a silent story of those who would conquer the land of the frozen north.

Those words—"The frozen north!" —flashed through my brain when I was notified by the Navy Department that I had been placed in command of an expedition to fly into that land of romance for the purpose of making an aërial photographic map of its topography. At that time, Alaska was to me the Alaska of Robert W. Service, a land of saloons, and gold, and "ladies" known as Lou.

Immediately upon receipt of orders to command the expedition I set about to organize it. There was much to be done. First and foremost, there were planes to be selected; then cameras to be obtained, a tender to be found, and highly skilled pilots and personnel chosen and trained. Realizing that we should have to fly over foreign territory,



A LAND WHERE WINGS ARE A NECESSITY

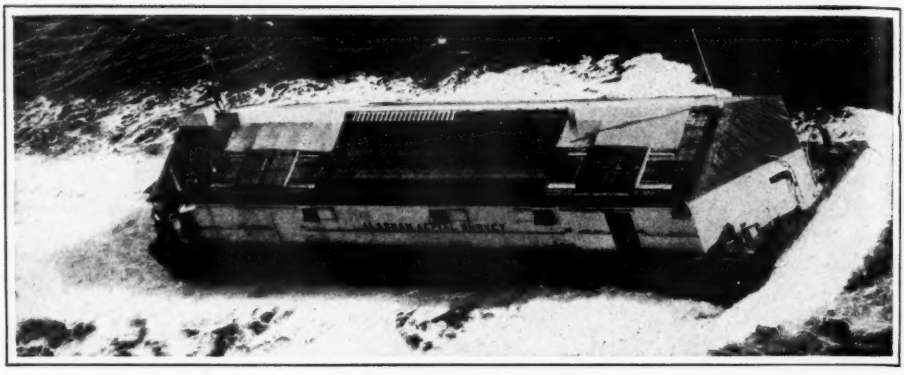
The average elevation of Alaska's mountain ranges is 6,000 to 7,500 feet. This scene is typical of the country over which the planes flew daily while engaged in the aërial survey.

TAKU GLACIER

Distance deceives the eye. This comprehensive view of Taku Glacier near Juneau shows its beginning at an altitude of 9,000 feet, its fifteen miles of moving ice, and its crumbling wall of ice, 200 feet high, at sea level.

we had to obtain permission from the British Embassy for the planes to operate in Canadian waters. Since much of the territory over which the planes would be operating was uninhabited and unexplored it was necessary for us to gather information as to the location of probable bases as well as to cache supplies, foods, gasoline, and oil at selected points. All of this and much more had to be arranged in a limited period of time.

The type of plane chosen was the Loening Amphibian, which represents the very latest development in aircraft. This plane was chosen because of its ability to land either on the water or on the land. If the pilot desires to land on the land he operates a lever which lowers a pair of wheels, and the plane becomes a land plane. The operation of raising and lowering the wheels reminds one of the folding beds used in apartments. This type of plane was chosen not with the idea that it would be possible to land in southeastern Alaska as a land-plane, but rather with the thought that it could be landed on the water and then by lowering the wheels the plane could be taxiied out of the water on to the beach where it could be securely tied down and otherwise protected from the severe storms which sweep up and down the narrow channels with hurricane-like force. The wisdom of our selection of this plane was brought forcibly to our attention during our first month's operations, when a very severe storm caused much damage to fish nets and small boats throughout the entire Alexander Archipelago. No sea-plane could have pos-

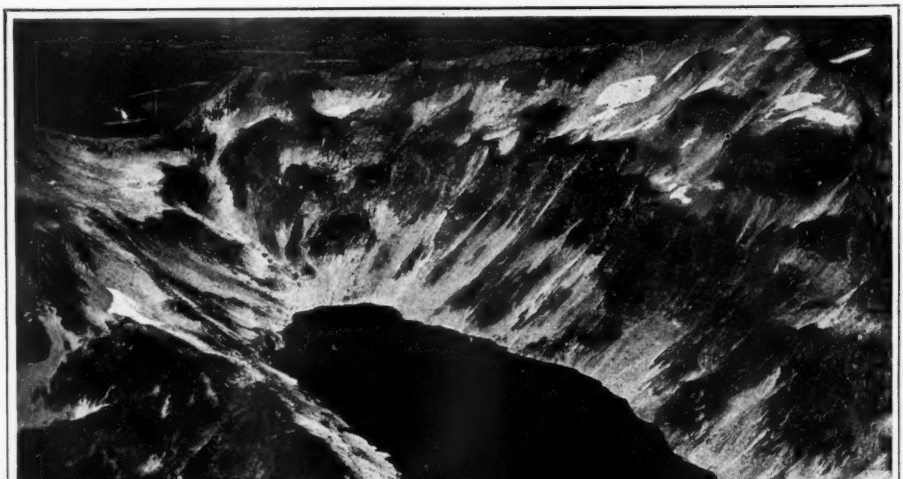


"THE COVERED BARGE," A FLOATING HOME

This covered barge was fitted with sleeping quarters, galley, motor repair shop, photographic laboratory, barber shop, and many other necessities.

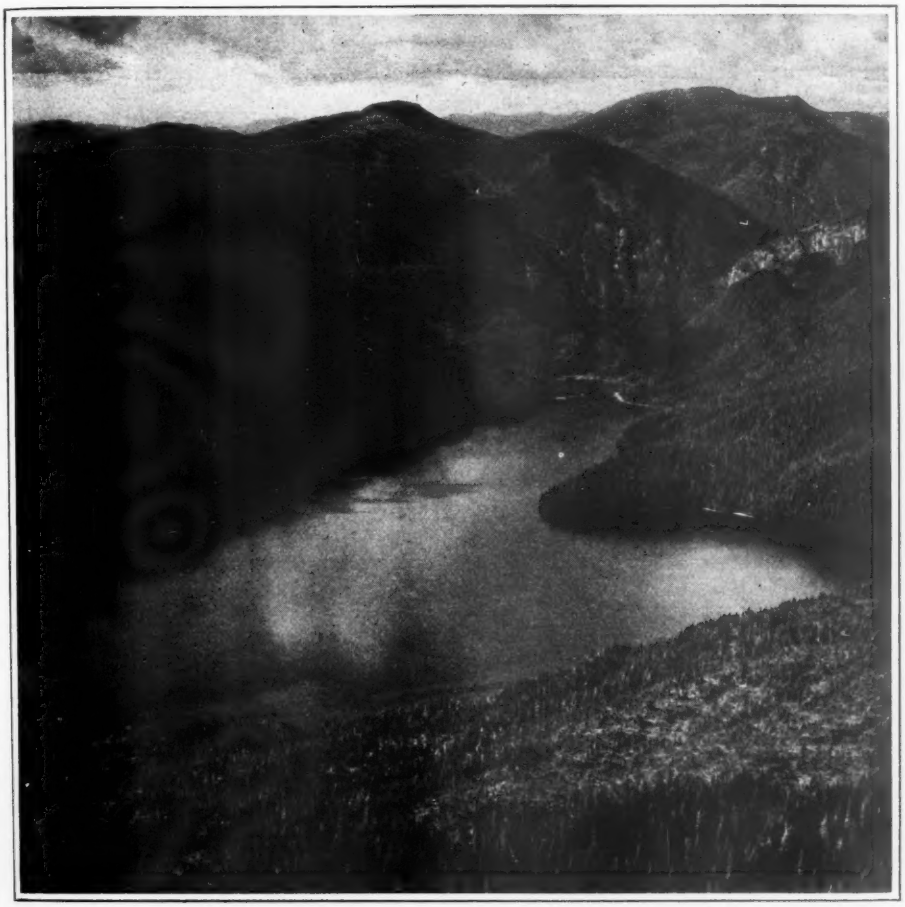
sibly withstood the storm, while moored out.

Another new feature of this plane is the fact that it is equipped with an inverted Liberty motor. Instead of the motor being placed in the normal upright position it is placed upside down. That is, the pilot, instead of looking out over the top rows of cylinders, is looking over the crank-case. The advantages claimed for this motor are additional horsepower, due to better cooling and lubrication; better vision for the pilot; and a higher application of the thrust,



AN UNUSUAL VIEW OF A CRATER LAKE

Guarded by grim ice and granite warriors, still defying the centuries, this great gem-like lake has for its setting the top of a 5,000 foot mountain.



VIRGIN FORESTS SURROUND ELLA LAKE

Almost impenetrable jungle-like forests cover the lower altitudes. Alaska must eventually become the premier source of supply for our paper and pulp industries. From the survey photographs the Forestry Service can determine the type as well as stand per unit area of timber.

since the propellor is mounted on the crankshaft, which in the inverted motor is near the highest point.

The cameras chosen were of the type known as the "Tri-Lens" and were invented by Major Bagley, formerly of the Interior Department. This camera, as the name implies, has three lenses, which operate simultaneously, giving three exposures. The center picture is a true vertical, the other two are taken at angles of 35° on either side. In order to use the two side pictures it is necessary first to transform them so as to give a projection in the vertical plane. For this purpose special transformers have to be built for each camera. The camera uses film which is made in rolls 6 inches wide and an average of 380 feet long.

Alaska is far removed from an aviation base, so that it was necessary to find a tender to serve the planes and provide supplies for the base. The U. S. S. *Gannet*, a vessel of the minesweeper class, was designated to this duty by Admiral Charles F. Hughes, then Commander in Chief of the Battle Fleet. Since it was not deemed feasible for the *Gannet* to quarter the aviation

detachment as well as her own crew some means of quartering these men in the vicinity of the airplane base was necessary. After considerable thought and worry the plan of quartering them ashore in tents was abandoned because of the torrential rains and cold. Instead of tents we used a floating covered barge, 110 feet long and 40 feet wide. This barge was fitted with sleeping quarters for the crew, a galley where the food was prepared, a motor overhaul shop for the care of the plane motors, a photographic laboratory where the film was developed immediately upon the return of the planes from a mapping flight, radio equipment for communication with the planes and tender when they were away from the base, hot and cold showers, a barber shop, and all the necessities of life as well as many of their discomforts. The opinion that the barge was a fine place to live in was jointly held by the crew and the Alaskan mosquitoes.

HOW AN AËRIAL SURVEY IS MADE

The lines indicate actual flights by planes and show the thoroughness with which an area is covered.

The organization of the expedition comprised three units—the planes, the tender, and the covered barge—and was entirely self-supporting as well as a mobile sea-going unit. With the *Gannet* as a means of transporting supplies from their permanent source and of towing the barge to isolated sections, the only requirements for a suitable base were a protected anchorage from wind and sea, a sufficient quantity of fresh water for use in photographic work, and a beach upon which to run the planes out of the water.

The personnel comprised twelve officers and one hundred men. The aviation detachment numbered seven officers including five pilots, a flight surgeon, and a supply officer, and forty enlisted men of various ratings. The *Gannet*, under command of Lieutenant

KETCHIKAN, ALASKA, ON TONGASS NARROWS

The first operating base for the aërial survey was Ketchikan, a city resting at a mountain's foot, built on piles and boasting a broad hard beach at low tide.

LOOKING UP THE CHICKAMIN RIVER

Many trappers and prospectors have lost their lives in the treacherous waters of this turbulent river down whose shores have washed the richest and most valuable gold deposits in America.

William R. Spear, carried her regular crew of five officers and sixty men.

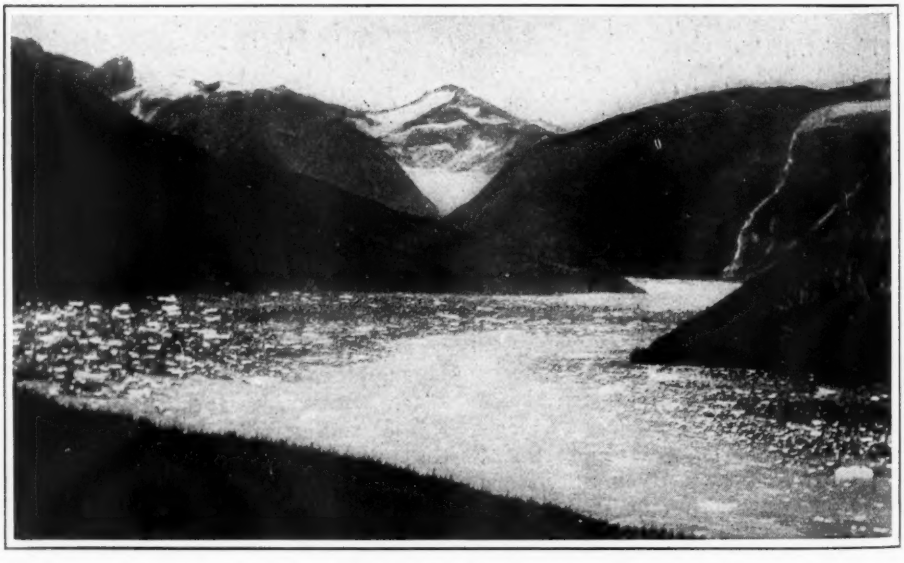
Since the only two practicable means of transportation in southeastern Alaska are by boat and air the Navy was logically selected as being the department to undertake the survey. Secretary Wilbur, having been requested by the Interior Department to make the survey, after consulting with Admiral Moffett, the Chief of the Bureau of Aëronautics, decided to undertake the work and placed the project under the direct supervision of Admiral Charles F. Hughes, the Commander in Chief, Battle Fleet. Because it was an air force problem the survey was in turn placed under the supervision of Captain J. M. Reeves, Commander of Aircraft Squadrons, Battle Fleet, who nominated me as Officer in Charge of the Alaskan Aërial Survey Expedition. This accounted for the fact that I was pilot of the leading plane leaving San Diego on May 24th.

THE MEN WHO MAPPED ALASKA

The officers and some of the crew of the aviation section of the Alaskan Aërial Survey Expedition, picked men of the Aircraft Squadrons of the United States Navy.

At Seattle, after a thirteen hundred mile journey up the coast, the planes and the *Gannet* made a rendezvous at the Navy Yard in Puget Sound. Here the covered barge was awaiting the arrival of the expedition. Aviation stores, the forty men of the aviation detachment with bag and baggage, commissary equipment, fresh water, and provisions were loaded helter-skelter aboard the barge—and the long journey to Alaska began. We were finally headed for Ketchikan, our first operating base.

Ketchikan is built on the side of a mountain and on piling over the water. Most of the main thoroughfares are



FLOATING ICE IN LE COUTE BAY

Many of the bergs which appear tiny in this picture are as large as ocean liners. Glacial rivers are always milky, and this whiteness marks the channel of the bay.

nothing more than docks built up in the manner of streets. The entire business district is on piles with the bottom floor a few feet above high water.

As we circled the city preparatory to landing in the channel—which was barely wide enough to turn the planes in—it appeared that the entire population of five thousand inhabitants were lined up on the docks and hillsides to give us a welcome. As soon as we landed we were met by so many small boats that it was necessary for me to stop my motor and direct one of the

CONQUERING AMERICA'S LAST FRONTIER

Two miles above sea level, but only a few hundred feet above snow-capped mountains whose ruggedness defies man's efforts to explore them. The aërial survey brings nearer the day of development of Alaska's tremendous natural resources.

POTENTIAL WATER POWER

One example of the many power sites discovered by the survey. The falls shown drop 1,500 feet, draining a lake seven miles long, then drop another 2,000 feet before reaching navigable water only ten miles distant.

boats to clear the way ahead so that we could go on to the beach. The boat led us into the dock and pointed to an area covered with water and told us that that was the beach. At first we thought that the Commercial Club of Ketchikan, which had written that they had a sand beach, had sold us a gold brick. However, we went in and anchored in about two feet of water. In about an hour we were resting on a firm sand beach and in two hours there appeared before our eyes a perfect hard sand beach with a baseball diamond laid out ready for play. The range of tide is more than twenty feet. At high water the beach is covered, at low water it is used as a baseball diamond. However, that diamond has been relegated to the younger element and a new and modern diamond has replaced it. One reason for the change was because the fielders objected to using a skiff when fielding a long drive.

On the next day, while awaiting the arrival of the *Gannet* I made a reconnaissance flight around the Island of Revillagigedo, (pronounced Ra-ve-ya-he-ha-tho, according to the *Gazetteer*, and in various other ways, mostly incorrect, by the populace), and over to the International Boundary. I shall not soon forget the feeling of awe that overcame me on this flight. Here we were, ready to begin the aërial mapping. As we climbed upward to four thousand feet, six thousand, then eight and ten thousand feet, until finally we were more than two miles above sea level and at times were passing only a few hundred feet above the snow-clad peaks and the next moment looking down from their dizzy heights to sea level, I realized that we had undertaken to assist in conquering America's last frontier.

At that moment the task seemed hopeless. But on the arrival of the *Gannet* the next day we made our first photographic flight, starting at three o'clock in the afternoon and ending at eight thirty, covering about four hun-

A CHAIN OF LAKES IN SOUTHEASTERN ALASKA
The scouring effects of ancient glaciers is noticeable throughout this section of the territory.

ALONG THE INTERNATIONAL BOUNDARY LINE
A mythical line drawn 10,000 feet above the sea over jagged snow-capped mountains and great glaciers whose icy slopes defy the puny strength of men to scale them, guarded neither by forts nor customs and immigration patrols.

APTLY TERMED "THE FROZEN NORTH"
Even the expedition's experienced aviators were awed by the silent majesty and grandeur of Alaska's mountains.

dred square miles of territory so rough and at places so inaccessible to man that months or perhaps years would be required for a survey by men on foot. This first success gave us hope and spurred us on.

In fact, due to the ruggedness of the high country and the almost impenetrable, jungle-like forests of the lower country, coupled with the inclement weather, little progress had been made in this region by the ordinary methods of survey. By the old method of surveying, a base line had to be run with a a transit and chain, and much of the area had to be covered on foot. By the aërial method the flyer takes his film and cameras aloft, flies over the territory and takes photographs. These are developed and then adjacent prints are matched together and a complete picture is made which shows the entire territory under survey. It is possible to scale this picture as accurately as any chart or, for that matter, blue print.

In short, an aërial survey is a picture which shows all objects in their exact position and size in relation to one another. The cameras are mounted in the bottom of the plane and kept in the vertical position so that the photographs are taken looking straight downward. The exposure of the films are timed so that the objects on the ground overlap on the print about 40 per cent. In other words, aërial mapping is nothing but a motion picture reversed—the camera does the moving while the objects photographed are stationary. The rapidity with which an aërial survey can be made is astounding. A plane flying at ten thousand feet above sea level making one hundred miles an hour can survey a strip seven miles wide and one

SWEETHEART LAKE

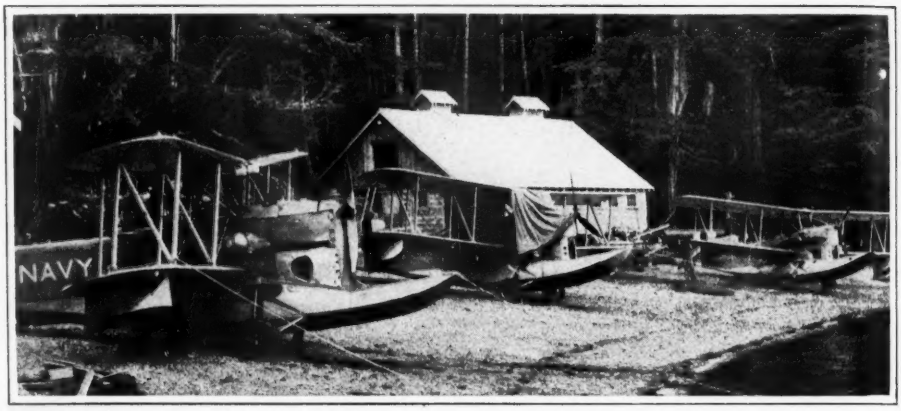
As a result of the summer's work of the expedition, hundreds of new lakes were discovered, many of them valuable sources of water power for Alaska's growing coastal cities.

hundred miles long—that is, seven hundred square miles—in an hour.

Only two of the planes were used for mapping. The third was equipped with a radio and, with a pilot, was kept on the beach, in readiness to institute search for any plane that might fail to return to the base within forty-five minutes of its schedule. Prior to the departure of a plane for a flight the exact area, courses, and routes were laid down on flight lines over the chart so that the position of a missing plane could be fairly well approximated, if it was necessary to search for it. All planes carried emergency rations for five days, guns, ammunition, fishing tackle, smoke flares, and homing pigeons in case of a forced landing. Fortunately, it was not necessary to resort to any of our emergency kits since no forced landing from any cause whatsoever occurred.

Not all of our time was spent in work. There were fishing and hunting trips. The mountains of Alaska abound in big game and constitute a hunter's paradise. The Alaska Brown Bear is said to be the fiercest flesh-eating animal in North America. This, no doubt, would be a pleasant thought to the pilot and crew as they were plodding their weary way homeward after having been forced to land by motor failure on a snow-clad mountain peak a hundred miles or so from their base.

Many a story was told us by the natives about their experiences while exploring the forests and mountains. One old prospector while well above the timber line ran face to face with a big brown bear. Not seeing fit to dispute his passage, he turned and ran. But the bear was also fleet of foot. After a time pursued and pursuer reached a lone sen-



OPERATING BEACH NEAR KETCHIKAN

Alaska's shoreline generally is rocky with high cliffs. Beaches were hard to find and even with the planes secured as shown a watch was maintained night and day.

tinel of the timber line, but unfortunately, according to the prospector, the nearest limb was twenty feet from the ground.

"No, sir," said the old prospector, "I didn't get that limb going up but, b'golly, I sure caught it coming down."

Our contact with the bears, however, was not limited to the stories told us by the natives. The sentry standing watch on the planes one night looked up from his fishing and suddenly discovered a husky fellow making inroads on his catch. When questioned later he was unable to state whether the intruder was a black or a brown bear. He didn't wait to see.

Of fish there were plenty. Captain Spear on his last fishing party brought back three hundred good-sized trout. For my part, however, I felt that if some local Burbank should cross the fish with the mosquitoes I should stand a better chance of getting a bite. The Alaskan mosquitoes are industrious, ambitious, and successful. There is also another pest, in the nature of a gnat, which inhabits the woods and is so small that the Indians call them "No See 'Ems." Many of my shipmates, being men of intelligence and reason, believe only what they see, but I, intelligent or not, believe in them firmly.

Much time was lost due to low clouds and rain. An Aërologist attached to the expedition kept a weather log, prepared a daily weather chart, and issued forecasts. However, the aërologist met with keen competition in the matter of forecasting weather. The native Indians have considerable weather lore which they fall back upon when forecasting. One of the old Indians who frequented the operating beach was very accurate in his estimates. He claimed that the ravens change the tone of their cry with a change of the weather. Another one told us that when the sea gulls come in and hover over Deer Mountain the winds are going to be strong from the southeast and will bring rain. Many of the steamship captains have given up the hope of forecasting the weather and close the question by saying, "You never can tell." Experience with the weather chart, however, has indicated that it is just as easy to forecast weather along the southeastern section of Alaska as it is elsewhere along the Pacific Coast. Certainly the forecaster will make a far better record than the average, should his forecast read daily, "Rain to-day and to-morrow."

From Ketchikan we worked our way northward, shifting our bases as the necessity arose, taking in the entire area from the International Boundary on the south to the Canadian Boundary

on the east and the Pacific on the west. At times the weather was discouraging—it seemed that it would never stop raining. When the weather was clear much progress could be made. Our average day's work for two planes was better than 1,000 square miles. On two successive days 1,600 square miles each day were surveyed.

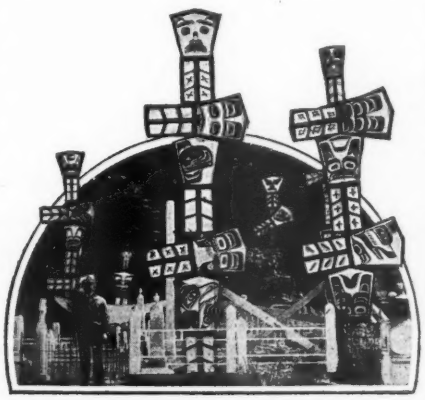
As one area was finished the *Gannet* would tow the barge and supplies to our next base. The planes as a rule would proceed with mapping and upon completion of the work fly to the newly selected base. Obtaining gas and supplies was quite a problem. While engaged in mapping, the planes consumed more than six hundred gallons of gasoline per day. When the good weather did arrive it usually lasted for about ten days, so that our plans had to be laid well in advance to prevent any delay in mapping operations. We were fortunate that not one day of mapping weather was lost for any cause whatsoever—nor was any plane out of commission when it could have been used for mapping.

During our summer's work many new lakes were discovered—the power of which no doubt will be used to turn the wheels of industry when the time comes to develop the tremendous resources of Alaska. Millions of acres of invaluable timber were brought to light—timber for the manufacture of pulp and paper—and much airplane spruce. The famous and treacherous waters of the Chickamin River, down whose shores have washed the richest and most valuable gold deposits in America, were thoroughly explored and mapped. We surveyed the chain of glaciers throughout the northern rim of the Alexander Archipelago whose great ice caps tower upward to heights as great as 15,000 feet and end abruptly in great precipices miles in width and hundreds of feet high at the water's edge. These great glaciers are the remnants of the Glacial Age. Some are still alive—moving slowly but surely a few feet a day, throwing off huge icebergs which fall into the sea with the roar of thunder.

On the Island of Revillagigedo a valley and low pass were discovered which in the opinion of Charles H. Florey, the Alaskan District Forester, will permit the linking up of all the important water power sites of Revillagigedo with the mainland and deliver more than eighty-five thousand horsepower to the city of Ketchikan.

Our work, aside from proving the feasibility of surveying by aircraft, was an acid test on the airplane itself, and it proved its ability to operate for long periods of time away from the home base under the most severe climatic conditions and with little or no protection from rains, storms, and seas. After the completion of the summer's work the planes were flown back to San Diego and were ready to begin operations with the fleet the day of their arrival.

Of course, all of us were looking for gold! And we found it. Some of us found it in the hills, others along the banks of the rivers, but all of us found gold in the hearts of the people of Alaska. The people of Alaska are of the pioneer blood of America; they are actuated by the same motives as those which made our forefathers cross the Atlantic and later fight their way across the prairies and mountains, and around the Horn. I, as well as the men under my command, deem ourselves honored and favored to have met, associated, and worked with the people of Alaska.



TOTEMS IN AN INDIAN CEMETERY

A Hospital in the Clouds

The Story of New York's New Skyscraper Medical Center

HENRY S. WILLIAMS, M. D.

"THE ADVENT of scientific medicine has given longer life to the present generation. The medical center movement, which is rapidly developing all over the civilized world, promises to give still longer life to the generations which are to come. Its aim is to produce better doctors, better nurses, better health workers, more certain relief from disease, and longer life."

In these words Dr. C. C. Burlingame answered my question as to the essential purpose of the new federation of famous institutions constituting New York's new Medical Center, of whose Joint Administrative Board he is the Executive Officer. With provocative enthusiasm, Dr. Burlingame went on to picture the enhanced efficiency for the realization of these ideals that must result from mutual coöperation of institutions located in close physical proximity—such an equipment of hospitals, laboratories, and schools as will constitute New York's new Medical Center, grouped on a twenty-acre site on the northern end of Manhattan Island. By modern methods of building skyscrapers in a hurry, the plans for the new institution are now far advanced and some of these buildings will be ready for the joint occupancy of their tenants before the close of the present year.

The enterprise which thus reaches the threshold of realization has been many years in maturing. A long generation ago, "two partners, Columbia University and the Presbyterian Hospital, conceived a vision. That vision was born of a wish to accomplish for the City of New York a broad union of the forces of medical practice, education, and research, to the end that man might reap the benefit." The vision began to take substantial form in 1911, when the Presbyterian Hospital became a "teaching hospital" for the Columbia University medical school, the famous College of Physicians and Surgeons.

LIKE A MEDIÆVAL CITADEL
The new Medical Center rises above the waters of the Hudson River like the fortress of a feudal lord.

Another evidence of progress came when the owners of the old American League ball park site at 168th Street, Mrs. Steven V. Harkness and her son, Edward S. Harkness, donated this twenty-acre plot, splendidly located overlooking the Hudson, for the purposes of such an affiliation of medical institutions as the Columbia-Presbyterian authorities had envisaged.

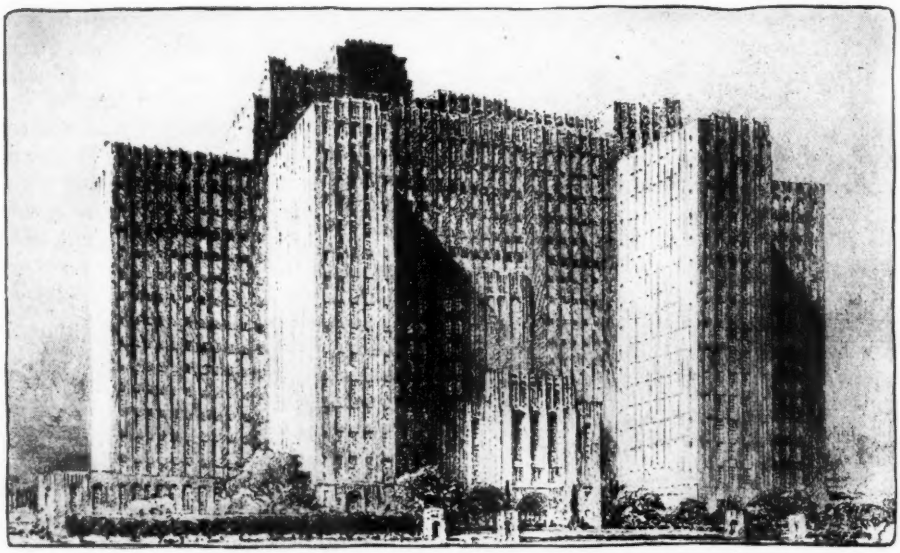
Yet several additional years elapsed before the appointment of the Joint Administrative Board, in 1921, which devoted three years to a survey of the medical field, at home and abroad, to discover the best methods of teaching, hospital practice, and research, in formulating the actual plans for the new enterprise. Finally, ground was broken for the first building on January, 31, 1925.

By this time, however, the project had expanded beyond the bounds of the earlier conception. The original "partners"—the College of Physicians and Surgeons of Columbia University and the Presbyterian Hospital (with its School of Nursing)—had now taken the New York State Psychiatric Institute and Hospital into the coalition; and four other notable institutions—the Babies' Hospital, the Neurological Institute, the Sloane Hospital for Women, and the Vanderbilt Clinic—entered the beneficent federation on terms of full equality, before the close of the year 1925.

Thus the partnership has come to be a Medical Center with no fewer than eight important units, each of which will maintain its identity and perform its original functions as of old—but with added inspiration of mutual contact, in an organization where, in Dr. Burlingame's words, there is economy of resources in that no two institutions undertake to perform the same service, and no two compete in matters of purchase or expenditure; the ideal being "institutional coöperation, not competition; association, not consolidation; coördinated knowledge, but individual service; group service, but individual attention; with all health workers trained together." Dr. Burlingame very properly dwells on such intellectual aspects of the enterprise, rather than on the mere physicial equipment of the Medical Center. Yet of course the two are indissoluble, like function and structure in a living organism. So it is by no means an unessential detail that all the institutions in the coalition (and sundry others that are expected to join in future) shall be housed at the same site. But this, obviously, would be impossible except under very modern conditions of steel-and-concrete architecture, where ground space is supplemented, and in effect magnified, by the utilization of sky space, story on story.

And so we find the central building at the new Medical Center, now exteriorly completed, is a skyscraper of twenty-odd stories, its precipice walls faced (we are told) with four million bricks and dotted with four thousand windows; looking for all the world like a gigantic apartment house or a Wall Street business block. In reality, this is the structure originally designed to house the College of Physicians and Surgeons and the Presbyterian Hospital, in adjacent wings, with a great corridor between; but now expanded laterally, in process of growth, with contiguous wings,

ONE OF EIGHT IMPORTANT UNITS
The New York Psychiatric Institute and Hospital as visualized by the architect.



AN ENVIRONMENT OF BEAUTY

The Columbia-Presbyterian Medical Center, now nearing completion, as it appears when viewed from the north on Broadway.

so that this one compact unit will shelter also the Sloane Hospital for Women, the Harkness Pavilion for private patients, the Babies' Hospital, the Vanderbilt Clinic and associate outdoor departments (with capacity for 2,000 patients daily), and the Columbia University School of Dentistry.

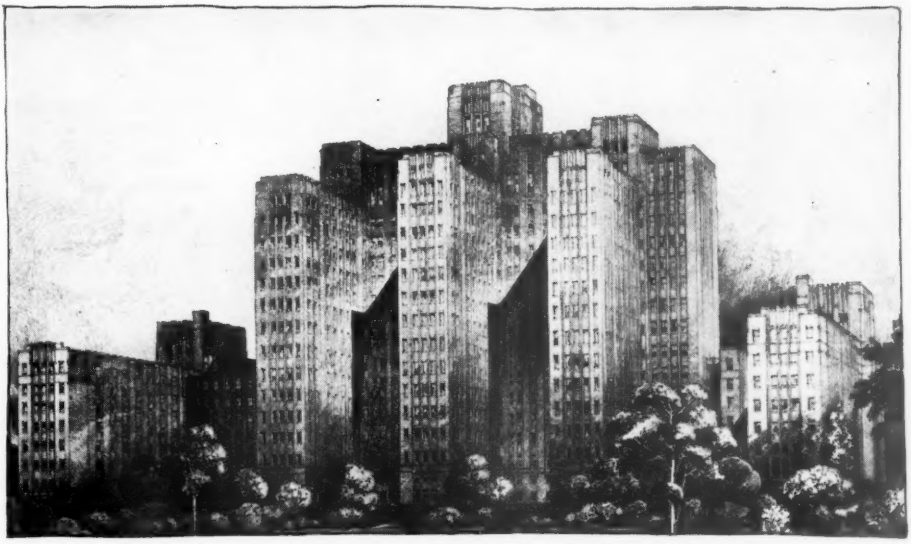
All these institutions under one roof, or series of roofs, in closest possible propinquity. And grouped about this central building, within stone's throw, will stand the Residence of the School of Nurses, the buildings of the Psychiatric Institute and the Neurological Institute, and ultimately sundry other specialty hospitals.

The architects' drawings, in connection with the airplane photograph, make it clear that the Medical Center group, when completed, will present a most impressive ensemble. As viewed from the Hudson, or from the Palisades beyond, the succession of walls rising from different levels, visually superimposed to seem like a single structure, with twenty-acre base, towering to an incredible pinnacle, will perhaps suggest a glorified mediæval castle or—more appropriately—the Ultima Thule of New York's new light-giving type of pyramidal architecture.

I was privileged to inspect this building recently, at the invitation of Dr. Burlingame, and under escort of his associate, Dr. Frederick MacCurdy. Passing along hallways tenanted only by workmen, we came to a geat formless corridor on the ground floor, studded with steel beams and carpeted with a network of iron pipes of assorted sizes, and showing reminiscent fragments of the 188 miles of wire which, I was told, entered into the construction of the building as a whole.

"Some people think this the most important part of the Medical Center," said Dr. MacCurdy. "It is the common kitchen for all the hospitals of this unit. When in full blast, it will be able to supply about six thousand meals daily. It will serve two thousand patients at once. And over there will be the laundry for the whole Center, with capacity of ten tons a day."

Nothing that I saw at the Medical Center took firmer grip on my attention, or more stimulated my imagination, than these homely details. Six thousand meals! Ten tons of laundry! Somehow,



A MOST IMPRESSIVE ENSEMBLE

Architect's sketch of the first group of Medical Center buildings, showing the Harkness Pavilion (left), Presbyterian Hospital (center), and Babies' Hospital (right).

the mention of these prosaic aspects of the Medical Center's activities seemed to humanize the entire project, while at the same time suggesting a tangible measure of its magnitude.

"You will readily see," Dr. MacCurdy continued, "that great economies of management must result from grouping several hospitals in one coöperative scheme like this—with a single power house, a single kitchen, a single laundry to supply them all. These are savings that can be measured in dollars and cents—and dollars and cents are always at a premium in hospital work, as you know."

Entering a construction elevator, we were lifted skyward and we stepped out into cloudland. As from a mountain top, we looked this way and that, on a panorama limited only by atmospheric conditions. On this clear day, the entire metropolis lay sketchily beneath us, with the Woolworth Building there in the blurred distance, and even a suggestion of the Statue of Liberty and Staten Island in the mist beyond. In the same eye-sweep one noted East River bridges; and then, northward, glimpses of Long Island and the Sound, and, in the mid-distance, High Bridge and the Mott Haven ensemble. All Harlem lay miniatured at our feet. At the west, far below, swept the broad plain of the Hudson, stretching away to the dwarfed Palisades, and a New Jersey vista that ended only with the purpled haze enshrouding the Orange Mountains.

It is altogether unlikely that the general tourist will ever be privileged to view Manhattan from that particular coign of vantage. But there will be thousands of New Yorkers in years to come who will gain new conceptions of the topography of the city in which they live, through view gained from the windows of hospital wards in which they sojourn as patients. Nor does it stretch the probabilities to assume that a fair proportion of these patients will have their convalescense hastened, and fortified by the influences, æsthetic and physical, of the topographical location of the Medical Center—with hospital wards at a significant elevation above sea level, a surfeit of fresh air from the bosom of the Hudson, and floods of sunlight to rival a mountain sanitarium.

If I speak thus with enthusiasm, I am nevertheless speaking by the book. Note,

for example, that all quarters for patients in the Presbyterian Hospital wing of the great building are on the sunny side of the upper half of the skyscraper. Two floors, the twelfth and the thirteenth, are given over to the Sloane Hospital for Women. There are sixty-five beds to the floor, more than half of them in private rooms of from one to four beds, with direct sunlight for every room. The public wards, with twelve beds each (there is none larger), are in narrow projecting wings that admit the sun on three sides. There is a window for every bed. Add that there are solaria equipped with the new "quartz glass" windows that admit the ultra-violet rays of light that are cut off by ordinary window glass, and it will be obvious that the invitation to the sun could not well go farther.

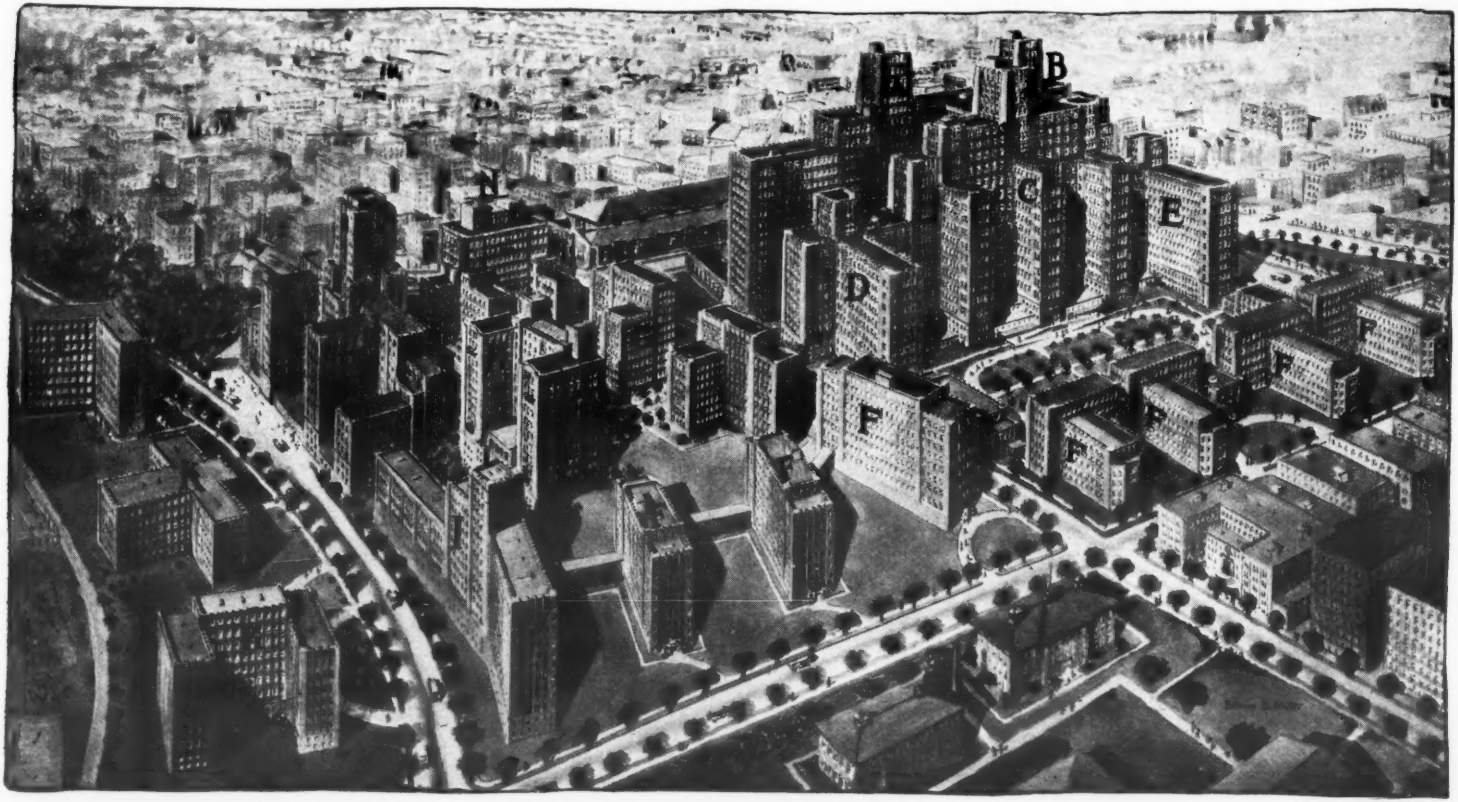
It will be obvious, then, that skyscraper construction applied to institutional needs has some very marked advantages; and it may be assumed that each of the schools, hospitals, laboratories, and clinics about to be quartered at the Medical Center will find its new physical equipment superior to anything it has hitherto enjoyed. Yet that, after all, is a minor consideration. Each of the members of the coalition is an established institution that has done splendid work in its old quarters. The oldest of these institutions, the College of Physicians and Surgeons, has been active for much more than a century; the youngest, the unique Neurological Institute, has functioned since 1909, and last year received more than 50,000 visits from persons in need of its special type of service. Visits of outpatients to the Presbyterian Hospital, the Sloane Hospital for Women the Babies' Hospital, and the Vanderbilt Clinic aggregated approximately 300,000. The Psychiatric Institute is the research department of the New York State Hospitals with an aggregate of about 45,000 beds.

That institutions with such past and present opportunities for service will be better equipped for even more comprehensive service at the Medical Center, is, I repeat, a matter of minor consideration. The major consideration is that these institutions are joining forces in a common cause. In 1925 there were 6,896 hospitals in the United States, with 837,000 beds; representing an investment of about $684,000,000. The twenty-million dollar plant of the new Medical Center does not add to the number of hospitals, nor very greatly to the number of beds. Nor do the Columbia University medical school and the Presbyterian Hospital School of Nurses seek to enlarge their enrollment. What is sought by both hospitals and schools is better opportunity for coöperative service. The true significance of the Medical Center is to be gauged, not by the splendid physical structures that are rising on Washington Heights, but by the spirit that actuates the members of the federation.

"Each instituion," says Dr. Burlingame, "is being reconstructed with a realization of the responsibility that it must carry as its own specific part in medical progress, but it is inspiring to note that it is also rebuilding with a full realization of the part it must play as one of the group engaged in the high purpose of blending institutional ambitions with 'whatever is best for scientific medicine and for those who are sick.' Unless this spirit were to prevail, the twenty million dollars to be expended in providing a material home for this great union of medical research and philanthropic endeavor would be largely thrown away. But this spirit *does* prevail and will continue to prevail. From first to last, it is the opportunity for complete intellectual unifying of scientific medicine in all its branches which has been the impelling motive in the movement."

"The complete intellectual unifying of scientific medicine in all its branches!" That phrase sticks in the mind. And the thought that follows is that such unification is day by day becoming more imperative. The extraordinary growth of special knowledge in recent years has essentially changed the aspect of medicine as science and as practical art. Caring for the human body is no longer a one-man job.

The Secretary of the Council on Medical



PLAN FOR NEW YORK'S MEDICAL CENTER

A College of Physicians and Surgeons
B Vanderbilt Clinic
C Presbyterian and Sloane Hospitals
D Harkness Pavilion
E Babies' Hospital
F Specialty Hospital
G Future Personnel Housing
H Presbyterian School of Nursing Residence
I Student Dormitories
J N. Y. State Psychiatric Institute and Hospital
K Proposed Social Center and Gymnasium
L Proposed Graduate Nurses
M Intramural Convalescent and Recovery Home
N Neurological Institute
(A, B, C, D, and H now nearing completion.)

Education and Hospitals of the American Medical Association recently declared that "more exact knowledge regarding the causes, treatment, and cure of diseases has been obtained during the last fifty years than in all previous time."

The modern specialist, then, is the result, as he is the exponent, of medical progress.

Human maladies, however, are not always segregated. The man whose nervous system is out of kilter may also have a diseased appendix or unruly kidneys. Of course the competent specialist has good general knowledge of maladies of all types; but, equally of course, he cannot have really up-to-date efficiency outside his own field. So the patient, to make sure of the integrity of all his organs, may pass from one specialist to another—with a saving of both time and money.

To meet this condition, it is becoming more and more usual for specialists to group their offices in the same building, often with a common waiting room; so that the patient can step across the hall from the office of the internist to that of the ophthalmologist, for example, or to the X-ray department or the chemical hæmatological laboratories. The services of perhaps half a dozen experts are required to complete the examination which is the modern equivalent of what the family doctor in the old days was supposed to accomplish by feeling your pulse, looking at your tongue, putting his ear to your chest, and asking half a dozen general questions.

The Medical Center merely carries this idea of coöperation of specialists to its logical conclusion. It represents the grouping of offices on a large scale, with patients by thousands instead of scores; with joint equipment for diversified examinations and special treatments such as few private offices can afford. The combined knowledge and experience of its groups of specialists is at the service of every patient. Yet the personal touch will not be lost; for the plan is such that every patient, after the preliminary examination, will find himself always in charge of the same physician, however numerous the consultants who may cooperate in his service.

But even while we thus emphasize service to the individual patient as the prime immediate function of a Medical Center (as of the physician in private practice), the thought recurs that, in the last analysis, the equipment of the new institution may be destined to play a far more important rôle for the benefit of humanity through the operation of its research departments on the one hand and its educational departments on the other. It is well within the probabilities that the research laboratories, fortified by the coördinate clinical facilities, may yield discoveries that will give added health and happiness to entire populations for generations to come. And in any event, there will go forth year by year from the Columbia Medical School groups of young physicians whose paramount equipment for service to their aggregate hosts of patients will bear witness to the educational value of the Medical Center as a whole.

Justification for the hope—nay, the expectation—that important additions to medical knowledge will result from the coördinative activities of an institution of such splendid endowments is found in the amazing record of medical progress of the last half-century, every stage of which has found fruition through the coöperation of leading groups of authorities, followed presently by the rank and file of the medical profession at large.

The main features of this astonishing progress are known to every one, though not always consciously evaluated. To summarize the story in the most general terms, it suffices to recall that the average of human life has been extended by at least ten years; which is another way of saying that more than a billion years of life, in the aggregate, will be granted to the people of the United States now living, over and above what they would enjoy were the conditions to-day what they were in the time of our grandparents.

Even within the present century, the death rate in the United States has been reduced from more than seventeen per

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RIVALING A MOUNTAIN SANITARIUM

An airplane view of the Medical Center showing its splendid location on Washington Heights in upper Manhattan.

thousand to a little more than twelve per thousand—which means that more than half a million people are still alive who would have died last year had the mortality rate of 1900 not been decreased.

Between 1900 and 1923, the annual aggregate death-toll of five maladies—tuberculosis, typhoid fever, diphtheria, enteritis, and scarlet fever—fell from 4,245 per million of population to 1,607—representing a saving last year of more than 300,000 lives.

Medical discoveries, made effective by the coöperation of the medical profession as a whole, are responsible for these glorious acheivements. There is nothing in all history with which the stupendous achievements of modern medicine may be matched.

Prior to about fifty years ago, no one had any accurate notion as to the true causes of infections; much less did any one suspect the actual way in which contagious maladies are chiefly spread. The revelation that microscopic organisms are the chief death-dealers, and that insignificant insects are their chief agents of dissemination, profoundly affected the

medical profession, and all but revolutionized medical theory and practice. Antiseptic and aseptic surgery, serum and vaccine therapy, specific chemo-therapy, preventive immunology, the conquest of plagues through effective quarantine and by destroying insect and animal germ-bearers—these are among the major landmarks of the new era of scientific medicine.

The benefactions of the new science were confined to no age of life, no stratum of society: they encompassed humanity at large. But since childhood is the time of least resistance to microbic infection, the greatest opportunity for immediate life-saving was found in the conquest of maladies of early years.

Witness the statistical record: In 1880, the annual death toll in the registration area of the United States was 17.8 per thousand of the population; and 44 per cent. of all deaths occurred under five years of age. In 1923, the total death toll was but 12.3 per thousand; and only 19.6 per cent. of this reduced number of victims were under five years of age. Otherwise stated: more than two fifths of all deaths occurred under age five in 1880; less than one fifth in 1923. Yet otherwise restated: 8.71 child deaths per thousand of the general population in 1880; 2.41 per thousand in 1923—a saving of 630 child lives yearly per hundred thousand of the population.

Interpreting these figures in terms of present population, we find that the lives of approximately 855,000 individuals were spared last year that must have been sacrificed had only the medical knowledge of 1880 been available for their salvation; and that more than 718,000 of these rescued individuals were children under the age of five years.

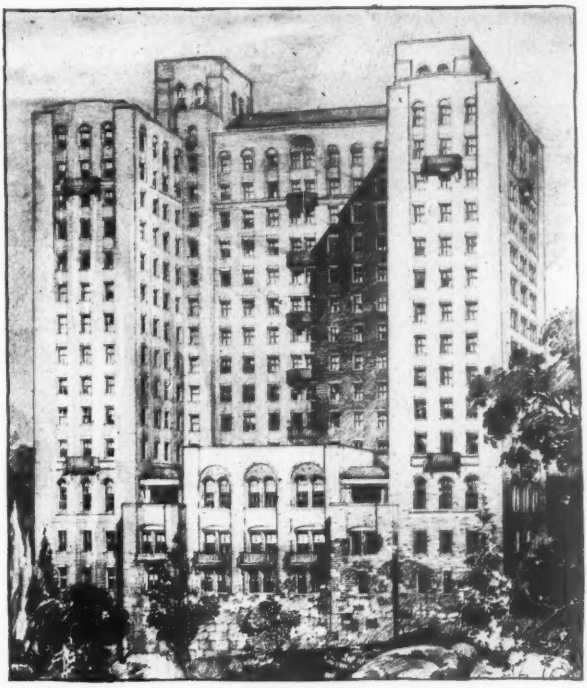
May I re-state the case once more, as applied to the children? Let your imagination grapple with this inspiring thought: There are in round numbers three quarters of a million children under five years of age in the United States to-day *who would have died within the past year* but for the advances in the art of saving life that have been made within the past half-century. The period of infancy and childhood is by way of being transformed from a death-zone to a health-zone.

The end is not yet. Details of application of the new methods are being perfected day by day. It is predicted that toxin-antitoxin inoculation will banish diphtheria absolutely from New York by the year 1930. Scarlet fever and measles are by way of being similarly controlled; and there is promise of immunity to tuberculosis—already a "scotched snake"—by a method even simpler in application, though the same in principle. But in the larger view it may be said that the conquest of the microbe is an accomplished fact. That chapter of medical history is completed, and the time has come to direct the resources of the new science against maladies of another order. The hosts saved from death in infancy and childhood are now dying of "degenerative" diseases of middle life. The saving of life beyond adolescence is in no wise commensurate with the early saving. The average life span has been extended, but not the total life span. More people than ever before now attain middle age; but it does not appear that the man or woman of fifty has any better chance to-day of living to be eighty or ninety than had the average man or woman of half a century ago.

As a matter of fact, it is rather doubtful whether the chance is as good. Maladies of the small group chiefly responsible for death after middle age appear to become more menacing year by year. Heart disease, kidney disease, brain disease, cancer, and diabetes were jointly credited with only 3,693 deaths per million of population in 1900; but with 4,649 per million in 1923—representing an added death toll for that year of more than one hundred thousand individuals; an aggregate death toll from this small group of maladies of more than half a million —and a standing challenge to medical science.

The foundation of medical centers is, at least by implication, an answer to that challenge. For the new life-saving campaign calls for the coöperation of specialists in many lines. The new problems

involved are at once chemical and physiological, medical and surgical, laboratory problems and bedside problems. New studies of the glands of internal secretion; the discovery of vitamins; the isolation of insulin; tentatives toward the treatment of cancer with proteins and with colloidal compounds; the attempt to combat the hitherto hopeless malady, general paralysis of the insane, with malaria plasmodia and with bacterial proteins—these are among the evidences of the trend of present-day investigation. Radiation therapy—the use of Roentgen ray, of radium, of ultra-violet ray—is at the very focus of medical attention. New studies of tissue metabolism—involving blood chemistry and histology, digestion and assimilation, glandular activity, the chemistry of proteins and other foodstuffs—are perhaps destined to play a rôle comparable to that of microbe-study in the campaign of yesterday.



A NURSES' RESIDENCE

Architect's sketch of "Maxwell Hall," Presbyterian Hospital School of Nursing Residence, now under construction.

For the carrying on of such investigations, the facilities and coördinate activities of a great institution are almost absolutely essential. In this field of ever-growing complexity, the isolated searcher has small chance of making a valid discovery, and still smaller chance to gain a hearing if unsponsored by high authority. In particular, there must be team work between the laboratory investigator and the bedside clinician. Personal contact with leaders in various lines of research is in itself inspirational. The new Medical Center, from its very magnitude and the diversity of its units, must offer team-work opportunities of the first order.

The ideal of the new medicine is—Prevention. It is urged, for example, that the out-patient department of the Neurological Institute, which will presently be transferred to the Medical Center, with its thoroughly trained staff of neurologists, psychiatrists, and special workers, performs a greater service through early diagnosis and the application of preventive measures along the lines of mental hygiene than by mere treatment of neuroses already in being. Through its Children's Mental Health Clinic, in particular, the Institute discharges what is regarded as perhaps its greatest service to humanity, in that it "aims to turn aside those tendencies which eventuate in crime; endeavoring to correst anti-social habits and attitude in their incipiency, and in so doing pave the way to the prevention of human misery and economic waste which follow from mental and nervous disorders beginning in childhood."

Such educational influences are important; but their scope is obviously limited. A far wider influence along the same lines will be exerted at second hand, through the agency of the medical graduates who

go out from the institution year by year, trained in the methods of the corps of specialists who have been their teachers at the Medical Center. For, be it understood, every institution that has joined the coalition has done so with the explicit understanding that its resources of every type—laboratories, hospital wards, clinics—are to be coördinate parts of the teaching mechanism of what thus becomes, in the fullest sense of the term, a medical university.

Here, then, are educational opportunities no longer localized or limited. The medical school functions through the activities of its far-flung phalanx of graduates. A school that admits only well-qualified matriculants, and gives them superlative training, gives maximum service to humanity at large. And assuredly at the Medical Center there is maximum opportunity for superlative training in every department of modern medicine, both theoretical and practical.

Few laymen, perhaps, understand clearly what this implies. The transformation of our medical colleges, to meet the rapid advance of medical science, has been effected so quietly as scarcely to have attracted public attention. The reform has been effected entirely from within the medical profession. New standards have been imposed that have resulted in the closing of more than half the medical schools that were in existence in 1900. Then there were 160 such schools; in 1926, there were but 79. The number of medical graduates decreased from 5,214 in 1900 to 3,962 in 1926. But more than 60 per cent. of the newest contingent of graduates were holders of baccalaureate degrees; and no one is now eligible to matriculate in a medical school of standing without having at least two years of preliminary college training.

The medical course explicity, covers four years; extended to the fifth year by an internship which is everywhere usual, and which in twelve colleges is prerequisite to graduation, and in twelve states prerequisite to registration for practice of medicine. This internship, indeed, is in effect only an extension, with added responsibility, of the hospital experience that every student now acquires at all "grade A" schools during the third and fourth years of his undergraduateship.

In the fullest sense, then, the modern hospital has become a "teaching" hospital—its share in medical education at least as important as the share of lecture halls and laboratories of the affiliated medical school. It is obviously desirable that hospital wards, clinic rooms, laboratories, and lecture halls should be in close physical proximity. That ideal has perhaps never hitherto been realized on quite so comprehensive a scale as at New York's new Medical Center.

Such will be the number of patients treated in the various hospitals and clinics at the Medical Center, that it would be theoretically possible for each of the two hundred students in the two upper classes to examine every day, under expert guidance, six bed patients and ten clinic patients—each student seeing a different group of patients. Thus every student, during the two concluding years of his undergraduate course, might have made, in the aggregate, upward of eight thousand examinations of patients of every type. In hundreds of cases he would have made diagnoses, and suggested definite lines of treatment, checked by mentors who include a galaxy of the most distinguished specialists of the medical world.

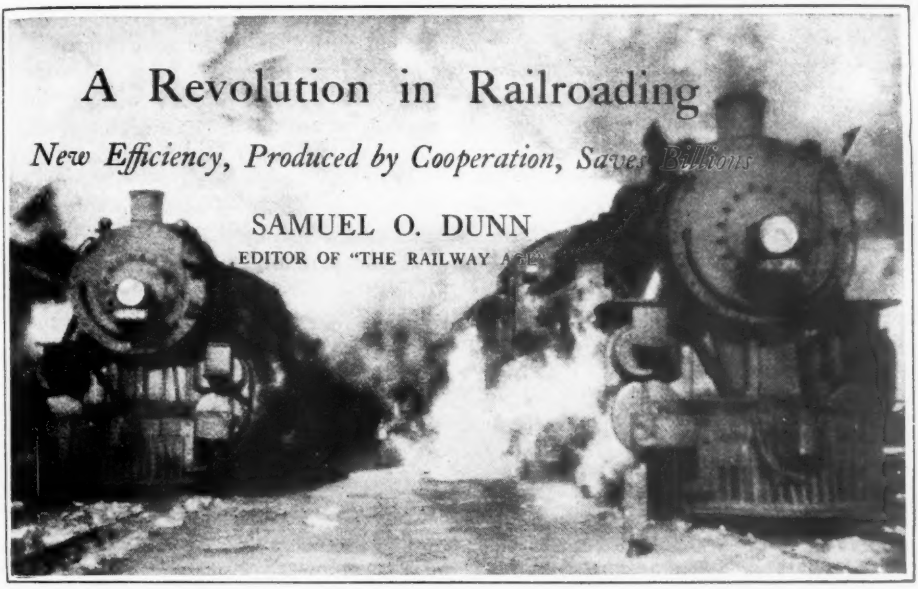
The student to whom such opportunities are opened, and who supplements this experience with a year's internship, during which scores of patients come under his eye each day, must be indeed lacking in natural aptitude if he does not go forth amply equipped to uphold the best traditions of his profession in any community. By the aggregate achievement of successive groups of physicians thus trained, the Medical Center's largest contribution to the welfare of humanity will perhaps finally be measured.

To foretell that this contribution will be large, calls for no special gift of prophecy. An institution endowed with such splendid equipment of material resources, men, and ideals could not fall short of high achievement.

A Revolution in Railroading

New Efficiency, Produced by Cooperation, Saves Billions

SAMUEL O. DUNN
EDITOR OF "THE RAILWAY AGE"



THE INCREASE in the efficiency of American railways in the last six years and the beneficial economic effects of improvements in that great industry have been sensational. So marked has been the change for the better in railroading since the days of government control that President Coolidge mentioned the improvements in his message to Congress, and both the Secretary of the Treasury and the Secretary of Commerce in their annual reports praised the railways for the great part they had played in producing abundant prosperity. As Secretary Hoover said: "The greatest industrial accomplishment since the war has been the reorganization of American railroads."

This silent revolution in American railroading has been brought about by rational coöperation between interests usually competitive or antagonistic—between rivals for business; between employers and employees; between buyers and sellers; and between a great industry and the government authorities charged with regulating it. By fighting less over their diverging interests and by coöperating to further their parallel interests, all elements have assisted in promoting the common good, so that the railway situation as a whole is better now from almost every standpoint than ever before in the memory of this generation.

But another factor has been active—a change in public sentiment, brought about by the effects of war-time operation under government control—a change which has resulted in better and more intelligent regulation. Let the public again "turn thumbs down" on the railways, and their condition and service might very soon revert to the conditions of 1920.

Dissatisfied employees might resort to strikes; dissatisfied shippers might effectively resort to political pressure to influence rates; and the railways would be back in turmoil, which can be avoided if sympathetic coöperation can be continued toward the end that still more efficient operation may produce higher dividends and wages, lower rates, better service, more taxes for government, and large savings to business by cutting inventories.

Speaking more definitely, in what ways has the railway situation been improved? In every way. Large general advances of both wages and rates were made in 1920 and general reductions of both were made in 1922. The most remarkable change that has occurred since then has been the

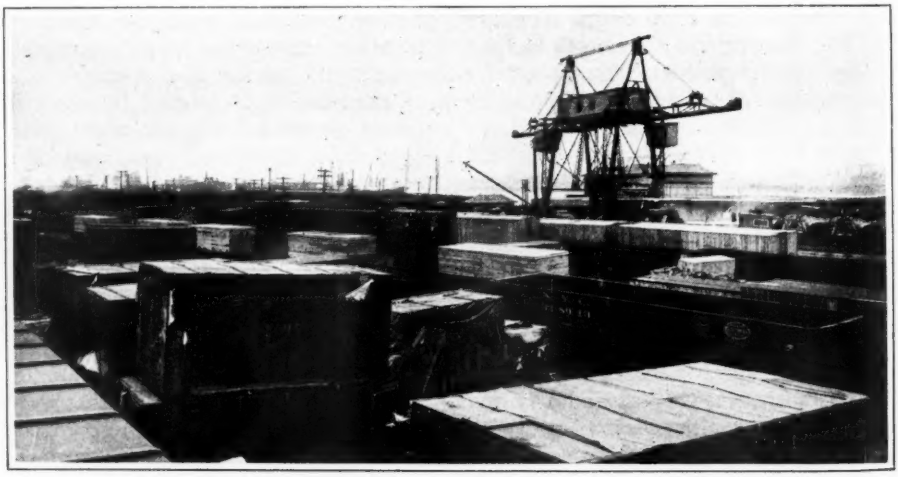
improvement in freight service. Meantime, wages have been increased and rates have been further reduced. The ever-growing burden of taxes has been made heavier, but despite these things the net operating income earned has substantially increased, prices of securities have advanced, the properties of the carriers have been put in better condition, and their capacity has been enlarged.

As moves the freight car, so moves commerce. We have other carriers, by water and highway, but the traffic handled by freight cars still dwarfs that carried by other vehicles. Practically all of even that freight that moves by water or highway also moves part of its way in the freight car.

The revolution in freight transportation that has occurred since the war has been the result of investing capital, planning, organizing, working to get the country's supply of freight cars constantly distributed in accordance with the needs of every territory—even of every community—and to make each freight car travel more miles per day. This is a simple statement of the means adopted to solve a most complex and difficult problem—a problem so important that failure or success in solving it has in different periods made a difference of many hundreds of millions of dollars in the annual income of the American people.

Ours is a huge country with a huge population and a vast commerce—a commerce much larger per inhabitant than that of any other country. To perform the railway's part in handling this commerce there has been provided about two and one half million freight cars. How difficult it is to distribute them so that they will always be where they are most needed may be illustrated by contrasting the conditions that existed in the last five months of 1919, when the railways were under government operation, with those that existed in the corresponding part of 1926.

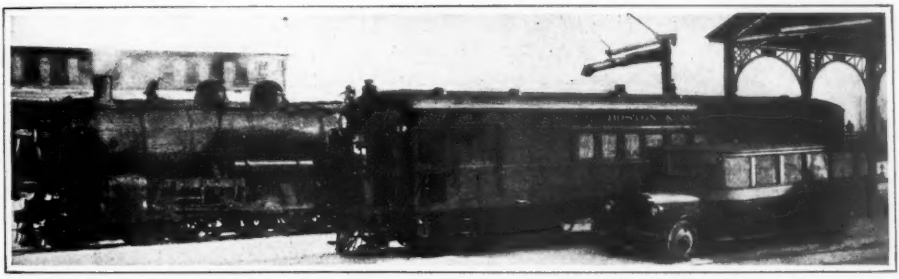
Under government operation the entire control of the distribution of cars, as of every other part of railway management, was centralized in the Railroad Administration. It had greater power over the railways than any central organization or agency has now. But power is never all that is needed to get results. There is an old story of a young minister who, down on his knees at a camp meeting, was loudly and repeatedly praying, "Oh Lord, give us power! Oh Lord, give us power!" when he was interrupted by an old deacon,



FREIGHT AWAITING CARS DURING THE WAR PERIOD

Evidence of the passing of the public's thumbs-down attitude concerning railroads is the investment of four billion dollars of new capital in the last five years, money which went to enlarge track and terminal capacity, provide faster and more powerful locomotives and stronger cars.

who said, "Young man, 't aint power you need; it's idees." In the last five months of 1919 surpluses of freight cars constantly were reported, averaging 34,392 per day, and at times reaching almost 60,000. But the railways did not furnish adequate transporation. Meantime, they reported car shortages that averaged almost 53,000 per day. This means simply that the idle cars were not the kind that were needed, or were not where they were needed. If they had been, the "car shortages" reported would have been much smaller, and much of the time there would have been none at all.



BORROWING ITS COMPETITORS

Many railroads, like the Boston & Maine as pictured above, are turning to gasoline-electric cars and parlor motor coaches for short line service. The result has been not only an economy but a profitable and satisfying public service.

The freight business handled in the latter months of 1926 was far larger than that of 1919. It represented the greatest increase that has occurred in any year since 1917. But during August, September, and October, when almost every kind of traffic was at the peak, from the grape crop of California to the iron ore of the Northwest and the bituminous coal produced in wide areas, shippers were furnished, when and where they wanted them, *99.7 per cent.* of all the freight cars for which they made requisition.

The differences between the effects produced on the business of the country by the kind of freight service rendered some years ago and that rendered within recent years have been as great as the differences in the kinds of service rendered. The conditions existing in the latter part of 1919 have been used for purposes of illustration; but they were not then new. There was a huge increase in production and freight business in this country soon after the war in Europe began. Throughout the five years 1916 to 1920, inclusive, so-called "car shortages" were chronic. Finding they could not get freight moved promptly, speedily, and satisfactorily, business concerns of all kinds, from users of raw materials to retail merchants, built up large stocks of commodities at the high prices then prevailing. The accumulation of these stocks created an artificial demand for commodities, which helped to cause prices to rise until they reached their maximum in 1920; and a great strain was put upon the financial resources of the country. Prices and business collapsed, and we were soon in the slough of the depression of 1921.

Very different has been the experience of recent years. Since early in 1923 railway service has been constantly equal to all demands. Finding it possible to get adequate and speedy transportation, business concerns began largely to reduce the stocks of goods carried by them, and to "buy from hand to mouth." During the last two years production and consumption have been larger than ever before. During such periods in the past commodity prices usually advanced. This increased the demands upon the banks for funds to carry on the increased business more in proportion than the increase that occurred in the business done. Within recent years, on the other hand, commodity prices of almost all kinds have declined,

with the result that the increased demands made upon the banks for credit have been less in proportion than the increase in general business activity. In consequence, there have been as yet no signs of the approach of an over-strained credit situation such as precipitated the deflation and depression of 1921. Undoubtedly, this has been largely or mainly because there has been little or no increase, and perhaps a continuing decline, in capital tied up in inventories—that is, commodities have been passing steadily from producers to consumers without accumulating anywhere on the way. Adequate, dependable, and speedy freight transportation has made this possible.

That the aggregate reduction of stocks of goods carried by business concerns throughout the country has been vast, amounting to several billions of dollars, is generally understood by business men, although no accurate estimate of the total reduction can be made.

One of the most remarkable cases is that of the mail order house of Sears, Roebuck & Company. This concern in 1920 did a gross business of 254 million dollars. Its stocks on hand at the end of the year amounted to 105 million dollars. In comparing these figures with those for later years allowance must be made for the large decline of all commodity prices that has occurred since the peak was reached in 1920. The gross business done by Sears, Roebuck in 1926 was approximately 275 million dollars—an increase over 1920 in physical volume of goods handled, as indicated by the government index of commodity prices, of at least 80 per cent.—but at the end of the year its stocks on hand amounted to only 49 million dollars. Its inventories in 1920 were more than 40 per cent. of its gross business; in 1925, less than 20 per cent.; in 1926, only about 17 per cent., or substantially less than half as much in proportion to the business done as in 1920.

The success of this concern in reducing its stocks so much in the face of a large increase in its business plainly reflects an increase in the efficiency of its own management. The same may no doubt be said of other concerns that have largely reduced their inventories. At the same time, such very large reductions would have been impossible without the improvement in railway service, and business men universally recognize this. It is probably significant that the president of Sears, Roebuck & Company within recent years has been Charles M. Kittle, who was formerly one of the ablest railway officers in the United States. His previous railway experience undoubtedly has helped him to take unusual advantage of the opportunities afforded by better freight service.

It has been authoritatively estimated that the reduction in stocks carried by the lumber industry has been 600 million dollars. The secretary of the National Lumber Manufacturers' Association has said that formerly the average time lumber was in transit from mill to retail yards was about fifty days, while now it is only from fifteen to twenty days.

Many other specific examples might be cited. The railways have taken advantage of the improvement in their own service largely to reduce the stocks of sup-

CONTAINER CARS EXPEDITE SMALL SHIPMENTS

At their destinations these container units filled with mail are quickly hoisted to waiting trucks. This innovation facilitates handling of freight in less than car lots and with a special glass lining has been successfully used in shipping milk.

TYPICAL CONGESTED YARD CONDITIONS IN 1920

At the 1926 traffic peak, shippers were furnished 99.7 per cent. of all the freight cars requisitioned. "The greatest industrial accomplishment since the war," says Secretary Hoover, "has been the reorganization of American railroads."

plies carried by them—a saving of millions. A company manufacturing automobiles reports that it formerly carried a three to four months' supply of materials, but has been enabled to reduce it to a two weeks' supply. Another automobile company reports that it has reduced its inventories from a forty days' to a ten days' supply. A department store in St. Louis reports that it has cut down by a million dollars the stocks formerly carried by it, and that the resulting saving pays all its freight charges. The amount of coal now carried in storage throughout the country probably is not two thirds as great as in the days of "car shortage."

It has been variously estimated that the annual cost of carrying commodities in stock—including interest, insurance, rentals, depreciation, obsolescence, expense of handling and rehandling, etc.—is from 15 to 25 per cent. of their value. It has also been estimated that the total annual saving to the industry and commerce of the country through reduced inventories is at least a billion dollars. It is, of course, impossible to make any rational estimate of the value to the country of having released for other purposes so much capital that formerly was tied up in stocks.

To coöperation is largely due the improvement in freight service. First, there is better coöperation between the railways themselves in distributing their freight cars. This is effected through the Car Service Division of the American Railway Association. Formerly, in periods of heavy traffic cars accumulated in great numbers upon certain railways because the preponderant movement of traffic was toward large industrial centers and ports on their rails. These railways became congested with too many cars, which left others with not enough.

When necessary the Car Service Division now issues explicit orders to particular railways to move cars from their lines to others that need them more; and these orders are conscientiously obeyed, even if the cars have to be moved empty. Under former methods of operation there would have been a serious shortage of cars last

summer for handling the record-breaking wheat crop of the Southwest. The introduction of a new "Combine" machine for simultaneously harvesting and thrashing the wheat caused it to be delivered by the farmers to the railways in twice as great volume in June and July as ever before. Under orders from the Car Service Division, however, railways throughout the country within a few days rushed thousands of cars to the southwestern lines, and the danger of serious losses to the farmers was averted.

An even more important new form of coöperation has been adopted between the railways and the shippers. Shippers and receivers of freight throughout the country have organized themselves into Regional Shippers' Advisory Boards. Each of these has committees composed of the shippers and receivers of the different commodities produced or marketed in large quantities in the territory of the board. They hold regular conferences with railway officers to interchange information regarding the probable demand for and supply of cars. Repeatedly there have developed within recent years conditions in different parts of the country requiring organized action by shippers or receivers to make it possible to handle freight satisfactorily. Such organized coöperation of receivers was necessary in Florida last year to control the movement of traffic into that state and expedite its unloading so as to prevent an almost complete blocking of the railway lines.

California's Grape Growers Avoid Disaster

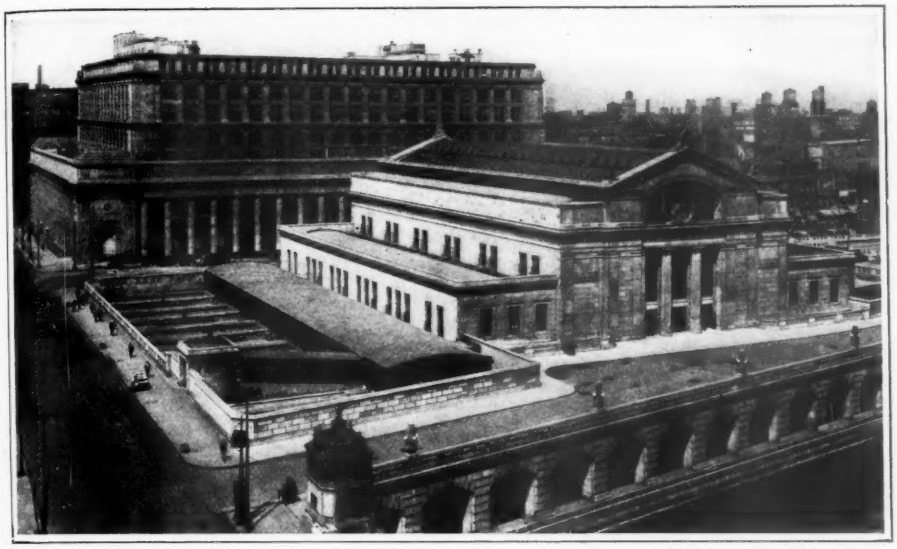
One of the most difficult problems ever presented to the railways is that of handling satisfactorily the annual grape crop of California, which has expanded enormously since the adoption of prohibition. The supply of refrigerator cars has been increased more than that of any other kind of equipment, but the demand for transportation for fruits and vegetables has grown still more; and only highly organized coöperation between the railways and the California grape growers to secure the most efficient practicable distribution and use of "freezers" prevented disaster to the growers in 1926.

There is another class of persons from whom the managements of the railways have sought and obtained coöperation—their employees. When the roads were returned to private operation their working forces were greatly enlarged and badly demoralized. The efforts since made to establish a better understanding and better relations between managements and men, through employee representation plans and other means, have been successful. The old morale has been largely or entirely restored on most roads, and it is doubtful if employees as a whole ever worked more conscientiously and efficiently than during the last three or four years.

Here, then, is an example of real democracy in industry—all classes concerned with railway results helping to improve them through representatives of their own choice.

While coöperation has played an important rôle in improving the railway situation, capital also has played an indispensable rôle. Capital, when wisely invested in a railway, enables it to handle traffic more satisfactorily to the customer, or to use fewer man-hours of labor and fewer tons of coal and materials in handling a given traffic. From the standpoint of those who furnish capital its principal purpose is to produce interest or dividends. Actually, the most important function it performs in a "capitalist civilization" is that of increasing the productiveness of human labor—of reducing the labor required to get a given output, or of increasing the output obtained with the same labor. Four billion dollars of new capital have been invested in the railways within the last five years to enlarge their track and terminal capacity, to provide faster and more powerful locomotives, larger and stronger cars, and so on.

The railways handled the unprecedented traffic of 1926 with only 2 or 3 per cent. more freight cars than they had in 1920. But on the average each freight car moved about 25 per cent. more miles than in



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THE WORLD'S FINEST RAILWAY TERMINAL

Chicago's new Union Station, completed last year at a cost of $75,000,000, boasts every convenience known to railroading. The train shed is to be seen in the foreground above, with the main building in the rear.

1920. This increase in the average miles traveled by each car was equivalent to an increase of more than 500,000 in the available supply of cars—excepting that freight service would have cost a great deal more money if so many more cars had been used to render it. The coöperation of the shippers helped to speed up cars by causing them to be loaded and unloaded more promptly, but it was the better physical facilities and operating methods of the railways that caused them to be switched into and out of trains and moved over the road more rapidly. This more rapid circulation of cars has been, of course, one of the main factors in the improvement of freight service which has been so beneficial to general business.

The locomotive is the power plant of the railway. The average locomotive was a much better power plant in 1926 than ever before. The average freight train of 1920 contained 37 cars, weighed 1,443 tons, and made ten miles an hour, including delays and stops. The average freight train of 1926 contained about 45½ cars, weighed about 1,750 tons, and made about twelve miles an hour. A ton moved one mile is the unit of freight service. When we combine the foregoing figures regarding the weight and speed of trains, we find that *average gross ton-miles per train per hour* in 1920 were 14,863, and in 1926, about 21,000—an increase of more than 40 per cent. in the amount of effective work done by the power plant of each train hourly. And, in proportion to the amount of work done by locomotives, fuel consumption was reduced 16 per cent.

These improvements in results are the cumulative effects of all the capital investment that has been made and all the work that has been done to improve operation since the railways began to recover from the depression of 1921 and the shop strike of 1922. As already stated, both rates and wages were reduced in 1922. The first year throughout which they were on the new bases was 1923. Downward "readjustments" of rates are always going on, and the reduction in the average freight rate since 1923, applied to the 1926 traffic, cost the railways last year about a hundred million dollars. Taxes have increased since 1923 about sixty million dollars. The average wage per employee was $35

greater in 1926 than in 1923. Not a large increase—but an increase.

But the roads were operated with almost 90,000 fewer employees than in 1923, in spite of the increased traffic; and this reduction of employees saved twice as much in operating expenses as the increase in the average wage cost. Countless other economies have been effected—reductions in the amount of fuel consumed and in the prices paid for it, reductions in accidents, reductions in loss and damage to freight, and so on. Consequently, in spite of reductions in rates, increases in wages, and increases in taxes, the net operating income of the railways was about 250 million dollars more than in 1923. They earned 4.48 per cent. on their property investment in 1923 and about 5.25 per cent. in 1926. They had to use a substantial part of their increased income to pay interest on their increased capital. But a number have begun to pay larger dividends. The time may be approaching when many will be able to raise capital by selling their stock. They have got 90 per cent. of what they have invested in recent years by further mortgaging their already heavily mortgaged properties.

The facts presented make a remarkable record of progress. Coöperation and capital have revolutionized railway operation and service. Either without the other would have accomplished much less. Probably there never again will be such lack of coöperation, especially between shippers and railways, as formerly. Whether there will be in future as large a flow of capital into the railroad industry as will be needed is a more doubtful question.

A large investment year by year will always be needed to enable them to handle a larger business and to handle it more efficiently and economically. But, as past experience has shown, the net return they are allowed to earn is always in danger, under our policy of regulation, of being ground too fine between the upper millstone of wage and tax increases, and the nether millstone of rate reductions. An arbitration board has just given the conductors and trainmen of the eastern lines the highest wages they have ever received by awarding a $7\frac{1}{2}$ per cent. advance. A corresponding advance to all railway employees would cost 215 million dollars a year. Congress, under political pressure, is considering bills for the arbitrary reduction of rates fixed by the Interstate Commerce Commission—such as the bill to abolish the sleeping car "surcharge." Will the public and those who regulate the railways show in future by their policy of regulation a recognition of the fact that sufficient capital can be attracted only by the earning and payment of returns satisfactory to investors?

Get sufficient capital invested in the railways, and economies will result which will make possible slow but sure advances in wages and reductions of rates—as has actually been the case during the last three years. On the other hand, the benefits of coöperation will soon be exhausted unless they are adequately supported by new capital. After all, it is the wise and adequate investment and management of capital in industry which in the long run makes almost all the difference between the small production, the low incomes, and the deplorable living conditions of nations like Russia and China, and the large production, the high incomes, and the good living conditions of our nation.

The Electrical Brains in the Telephone

Science Makes Machines that Almost Think

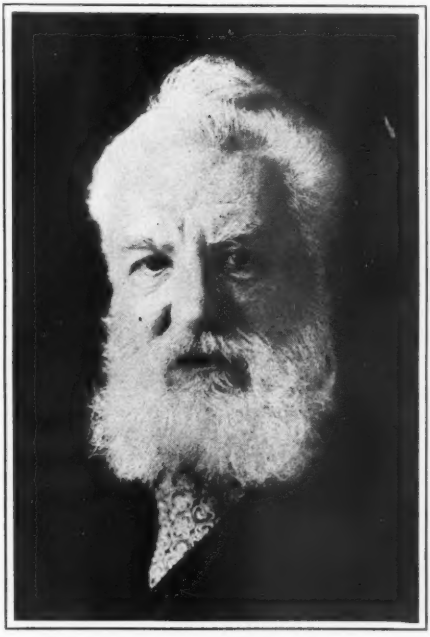
E. E. FREE

We have two thirds of the world's telephones and undoubtedly this great system of swift communication is a great factor in our prosperity and rapid development—and we have not yet reached the end of the improvement of the telephone. This article tells some of the principles affecting the new wonders of the transmission of sound by machines—as they were observed on visits to the great telephone laboratories.

IT IS exactly fifty years since Professor Alexander Graham Bell spoke seven historic words in front of a crude assemblage of coils and wires and bits of metal on a littered work bench in his Boston laboratory. "Mr. Watson," he said, "come here, I want you." In a moment Mr. Watson burst into the room in excitement. "I hear you," he cried. "I can hear the words." That was the beginning of the electromagnetic telephone, and now trans-oceanic telephony by wire and wireless is a possibility.

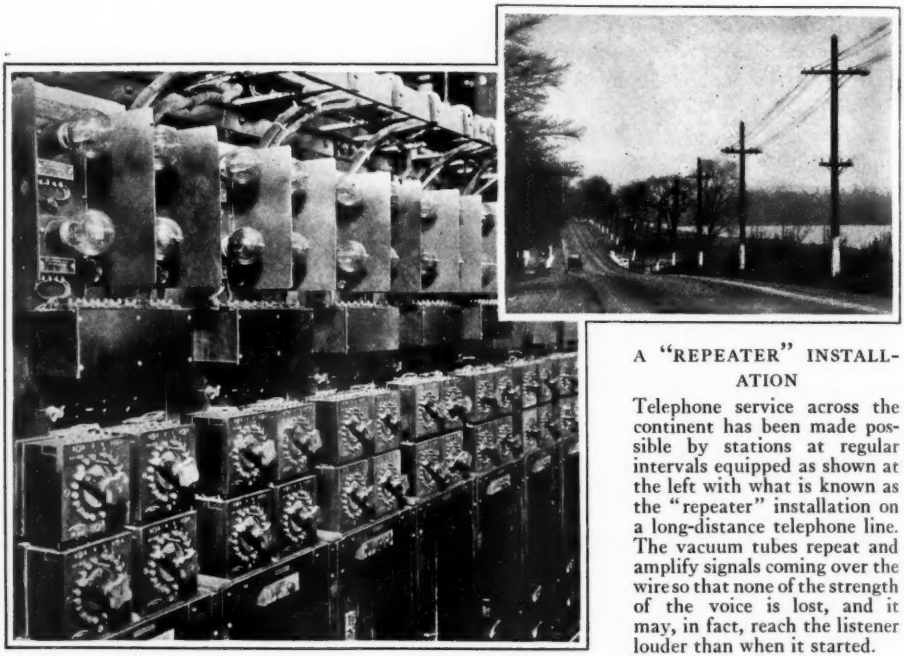
To-day the telephone wires provide channels for vast rivers of speech that flow throughout the world. While you are reading this sentence more than six million words will be spoken by telephone in this country alone; so many words that if you tried to repeat all of them you would be talking continually night and day for more than seven weeks.

All this has grown in fifty years from Professor Bell's seven words to Mr. Watson. It has not grown by accident. It would not have developed, even, from the mere duplication of what Professor Bell himself discovered. The telephone of to-day is a product of that most fruitful of plants, scientific research. The pioneers of the telephone were wise. They intrusted their future to science and their trust has proved well placed. Near one of the rivers which border Manhattan Island, where every moment sees some great ship come or go laden with the freight that is the world's commerce, stands the building of Bell Telephone Laboratories, an agent of that other commerce which is a commerce of speech. Here center the laboratory activities of the telephone industry. Here labor more than fifteen hundred scientific men to make the telephone still more useful than it is.



ALEXANDER GRAHAM BELL
"An institution is but the lengthened shadow of a man."

In these laboratories men study every material from the metal used for the sheaths of underground cables to the glue that fastens the wooden panels of soundproof telephone booths. Here

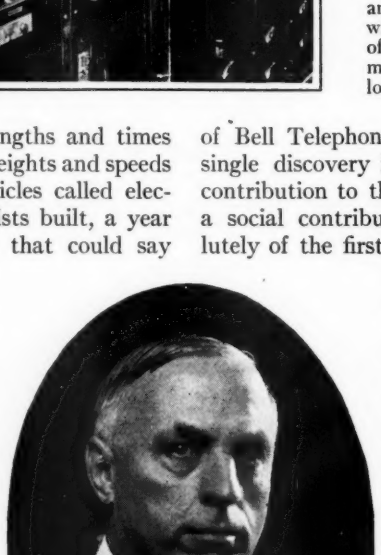


A "REPEATER" INSTALLATION

Telephone service across the continent has been made possible by stations at regular intervals equipped as shown at the left with what is known as the "repeater" installation on a long-distance telephone line. The vacuum tubes repeat and amplify signals coming over the wire so that none of the strength of the voice is lost, and it may, in fact, reach the listener louder than when it started.

scientists measure the lengths and times of sound waves and the weights and speeds of the tiny electric particles called electrons. Here two physicists built, a year or two ago, a machine that could say "papa" and "mamma" quite recognizably, when adequately coaxed. What is of more practical importance, these same machines, applied to the problems of electrical transmission of speech, yielded facts of value in the understanding of articulation and of how best to preserve this quality when speech is sent electrically over a wire.

It is probable, however, that future historians, looking back on this century from some vantage point in the future, will select as the chief achievement of Bell Telephone Laboratories not any single discovery in science or even any contribution to the art of telephony, but a social contribution which seems absolutely of the first rank. This institution has made coöperative science work.



GUSTAF WALDEMAR ELMEN

The discoverer of a new alloy of nickel and iron named permalloy, which possesses greater magnetic permeability than iron.

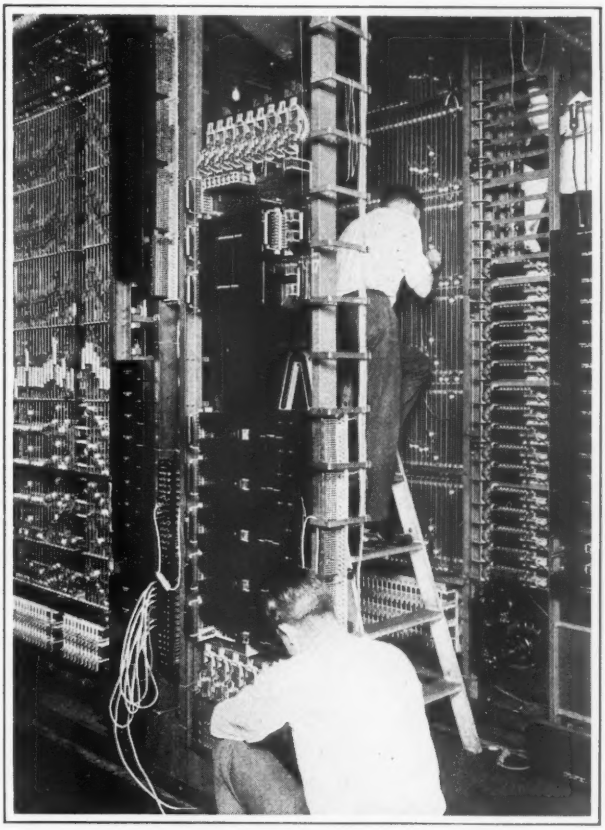
"We all recall," says E. B. Craft, executive vice president of the Laboratories, "the old days when scientific experimenters were lone workers. Each investigator had a room with a lock on it, with only one key, and each man carried his key. This method is still employed in many places, but, because of the tremendous complexity of our problems and the large number of problems that must be carried on simultaneously, no one man or no small group of men working

by themselves can accomplish the desired results." The solution which the telephone industry has used Mr. Craft calls the "group method"—"nothing more nor less," he explains, "than a plan for dividing the problem, no matter how complex, into its essential elements and assigning these problems to the individual or group of workers who is best equipped for that particular kind of work."

Whether we like it or not, this has become a scientific world. Like a man on a bicycle, science cannot stop: it must progress or collapse. There is probably no social problem that cries louder for solution than the problem of helping science to organize itself. The coöperative idea of Bell Telephone Laboratories is probably not all of the answer to this problem, but it is a part of it.

The present laboratories in New York City constitute an independent corporation owned by the telephone industry. "Previous to 1907," says W. S. Gifford, President of the American Telephone and Telegraph Company, "three laboratories or departments of development and research were maintained in the Bell System, one by the American Company at Boston, one by the Western Electric Company at Chicago, and one by the Western Electric Company at New York. In 1907, in the interest of economy and efficiency, these were consolidated so far as laboratory and experimental work was concerned into one unit in New York. It is this unit which has recently been given a corporate form and designated the Bell Telephone Laboratories, Incorporated. The Laboratories are owned jointly by the American Company and the Western Electric Company, the expense of operation being divided according to the nature of the work done." The Western Electric Company, it may be added, is the manufacturing and supply agency for the constituent companies of the Bell Telephone System.

Among the myriad articles with which this relationship to the telephone industry has required the Bell Laboratories to deal the one probably the most important is entirely invisible. No man has ever seen one of these articles. Probably no man ever will. They cannot be bought, sold, or kept in storage. Like fire, they must be produced where and when they are



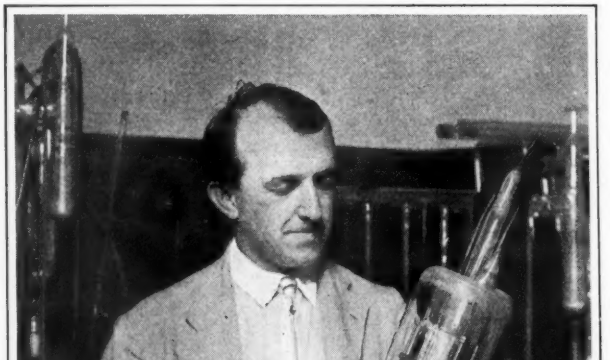
A PART OF THE "MECHANICAL BRAIN"

In the automatic telephone exchange, electric contacts, set into operation by the dialing of a number, determine the amount of switch motion and consequent circuits set up. The "mechanical brain" remembers the number asked, repeats it over the proper trunk line, and records the number of calls made each day.

needed. Yet without them the whole telephone industry would be impossible.

These articles are electrons—the tiny, invisible particles of electricity which compose electric sparks and are familiar to radio fans as the particles which operate that marvelous electrical microscope, the vacuum tube. It is not generally known that the vacuum tube has been developed and improved even more largely by the telephone industry than by the radio industry. Vacuum tube amplifiers were in use in telephone circuits before radio broadcasting was dreamed of. Indeed, it was the use of these vacuum tubes, back in 1914, which contributed materially to make transcontinental telephony possible.

In 1911 it was possible to telephone as far as from New York to Denver, but no farther. Even for this distance the wires used had to be large, almost as thick as a lead pencil. That meant a heavy cost for the installation of the line and correspondingly heavy charges for the tolls. Apparatus using vacuum tubes changed all this by permitting what is called the "repeating" of the message. Every one knows that the vacuum tubes of a radio set act to strengthen or "amplify" the very feeble impulses picked up by the antenna. On the long telephone lines the action is very much the same. In the present telephone line between New York and San Francisco there are more than twelve telephone repeaters, each containing two vacuum tubes. Thus the strength of the original voice is maintained, so that when speech from New York arrives in San Francisco it is loud, clear, and easily intelligible.

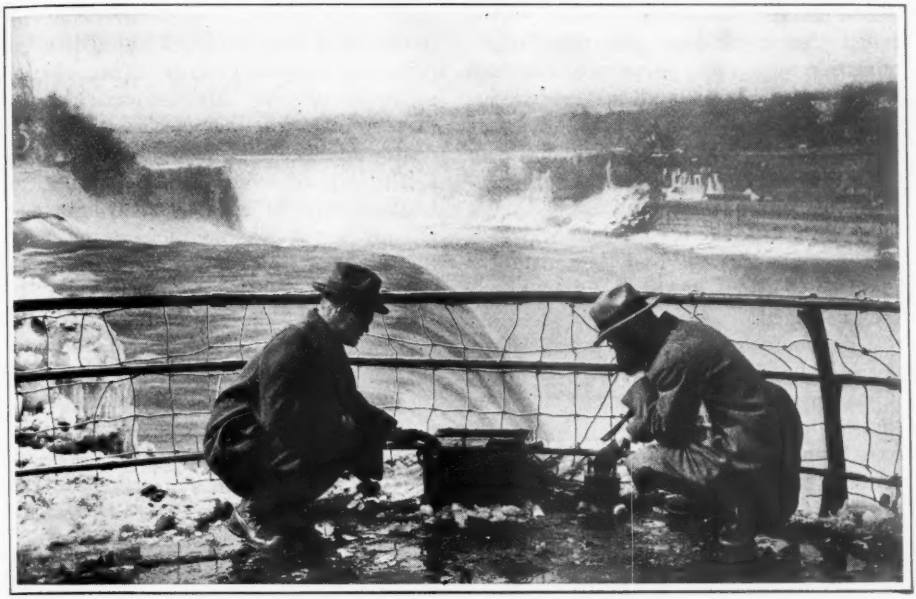


ONE OF THE MOST POWERFUL OF VACUUM TUBES

William G. Housekeeper, of the Bell Telephone Laboratories, holding a tube which discharges 100 kilowatts of electrical energy, equal to 130 horsepower. He invented the method of making an airtight seal between glass and metal. Development of such tubes may make commercial transatlantic telephony possible in 1927.

The secret of the vacuum tube, as all radio fans know, is a continual stream of electrons escaping from the hot filament at the center of the tube. Electrons are present, the physicists tell us, in all matter. There are more than a million billion billions of them inside an ordinary copper cent. When you stroke the back of the family cat in cold weather a million billion or so electrons jump between your fingers and the fur and make the tiny electric sparks that you see. Billions of them pass across the space inside a vacuum tube during every second that the tube is operating.

The work of the telephone laboratories with these electrons has involved two problems—producing them more



MEASURING THE NOISE OF NIAGARA FALLS

The audiometer, originally developed for the purpose of testing human hearing, is measuring the volume of sound emitted by mighty Niagara Falls in the above picture. The instrument has been used to determine the amount of noise at different places in city streets.

cheaply, and collecting them in larger quantities. Strictly speaking, an electron cannot be "produced." They merely exist, inside all material things, and the problem of the physicist is to get them out. Professor R. W. Wood reminds us, in one of those delightful nonsense books with which he has varied the sequence of his deeply scientific tomes, "To take the toucan from the tree requires extreme agility." It is the same with electrons. To take electrons from a copper cent or from a bit of wire, in both of which they occur plentifully enough, requires, if not agility, at least a full measure of ingenuity and expense.

The usual method of coaxing them out is by heating a wire, as is done in the filament of a vacuum tube, and one of the important developments in the telephone laboratories has been the perfection of kinds of wire which will emit more electrons from each unit of surface at a specified temperature. This means that electrons cost less. In turn, you need not pay so much to get their aid when you want to talk across the continent by telephone.

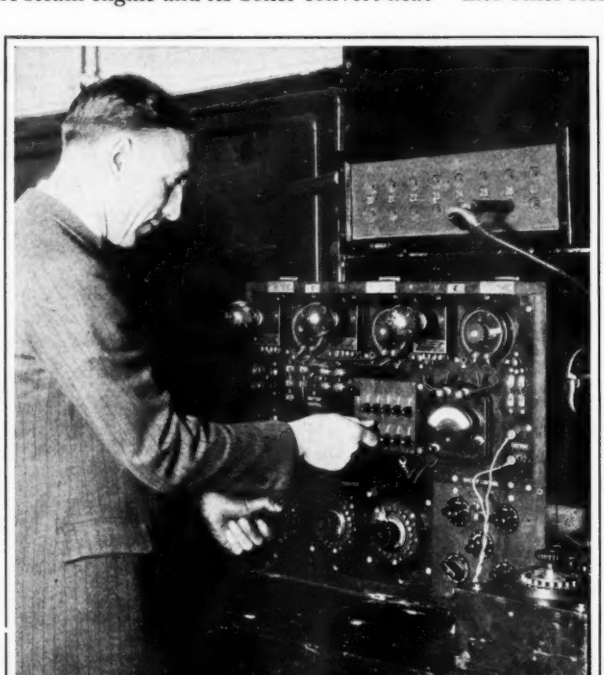
The small vacuum tubes used in radio sets and in the ordinary telephone lines carry only a very minute amount of current, much less than does an electric lamp. But for transoceanic radio far larger vacuum tubes are necessary. As far back as 1915 one of the achievements of the Bell telephone engineers was the production of the first large-size vacuum tubes, those which accomplished the first transmission of speech across the Atlantic. Commercial telephone service depends upon more recent developments of these same vacuum tubes. One of the Bell Laboratories engineers, William G. Housekeeper, by perfecting a way of sealing metal to glass so that both glass parts and metal parts could be used in the same vacuum tube, permitted the making of a vacuum tube so powerful that its output exceeds 130 horsepower, equivalent to that of ordinary automobiles.

Another project dealing with electrons is that of using light rays to kick electrons

out of metals. In scientific phrase this is called photoelectricity. If a small plate of certain metals like potassium or sodium is placed in a vacuum and exposed to light, the light rays have a remarkable effect on the metal. They eject electrons from it. It is as though some of the tiny electrons inside the metal were caught by the light ray at some occupation of which they were so ashamed that they instantly jump entirely out of the metal to which they belonged.

This photoelectric effect is important not only because of some relations which it has been found to have to the theories of the nature of light, but also because it constitutes one of the much-prized conversions of one kind of energy into another. A steam engine and its boiler convert heat energy into motion. A dynamo converts motion into electricity. An electric lamp converts electricity into light. Many such conversions are known. As we master more of them science and industry advance.

The form of energy which is most plentiful on earth is light, for the light and radiant heat received daily from the sun is thousands of times larger than any other source of accessible energy that we know. Unfortunately, the energy of sunlight is scattered; it falls on every man's acres alike. We cannot persuade it to fall in a concentrated beam on that particular square mile where scientists have set up engines to catch it. Furthermore, we know very few ways of converting sunlight into other forms of energy. The photoelectric effect is one of the few, and even it, as yet, is too feeble to do us much good practically.



A MACHINE THAT CAN SAY "PAPA" AND "MAMA"
Dr. John C. Steinberg manipulating an electrical oscillator which is capable of producing the vowel sounds of human speech. Such machines are used to study the physical characteristics of speech sounds and methods of perfecting transmission of them over wires and through electric apparatus.

Dr. Herbert E. Ives and his associates at Bell Telephone Laboratories who have been working with the photoelectric problems have already succeeded, however, in applying the escape of illuminated electrons to one practical problem, the transmission of photographs by wire. It was announced before the holidays that the telephone company was prepared to send personal photographs by telephone at Christmas. That this was possible was due to the ingenuity of the laboratories' scientists in perfecting apparatus by which these light-ejected electrons are harnessed and made to transmit pictures over the wires.

The true commerce that the telephone carries is, however, a commerce of speech, and it early proved necessary for the telephone

scientists to study just what speech is. There is much talk nowadays about "vibrations." With the vibrations of sound the Telephone Laboratories have had much to do. Perhaps the greatest of their advances is an idea—the idea of the essential likeness between the sound-reproducing electric impulses in telephones and the passage of sound waves themselves through horns or a violin or the sounding boards of pianos. Compelled to study sound vibrations because these are a part of the load which the telephone carries; compelled to examine these vibrations by electric methods because the transmission of them is electric; the telephone experts, led by Joseph P. Maxfield and Henry C. Harrison, applied the theories thus developed to the problems of sound transmission in other fields. One result is the orthophonic Victrola, a machine in which the sound vibrations originally impressed on the record are reproduced and discharged with the minimum of loss and change.

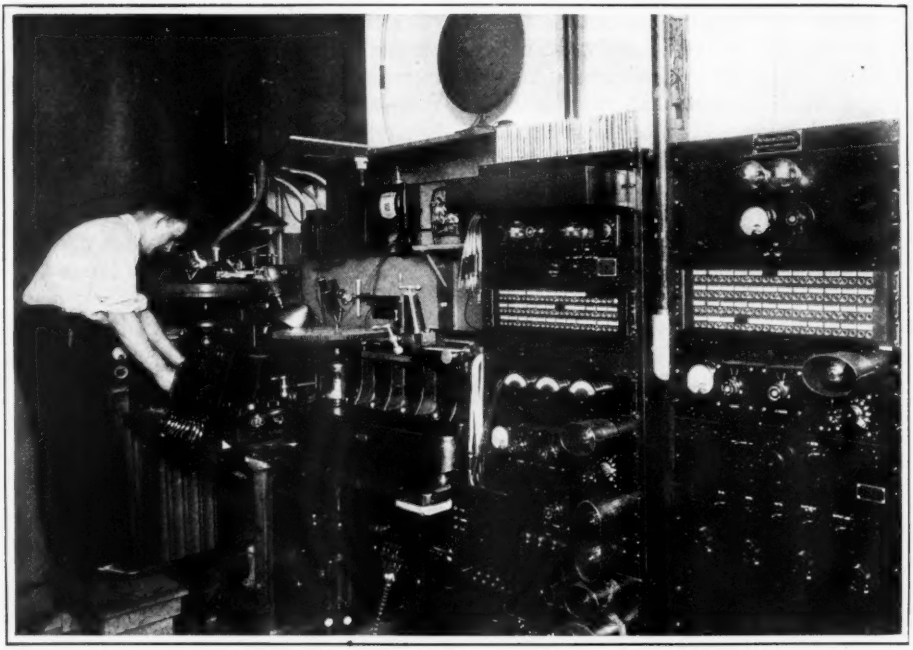
THOMAS A. WATSON

It was to Mr. Watson, then an assistant to Professor Alexander Graham Bell, to whom were spoken the words first successfully transmitted by wire on March 10, 1876.

Another result of the study of sound is the Vitaphone, the talking motion picture. Like so many other examples of the Laboratories' work, this examplifies the advantages of the group system of research. The problems involved covered most of the field of physics. No one man, unaided, could have fought his way through them all. To scores of experts, each a specialist in some one of the problems to be met, all difficulties proved surmountable. At a recent meeting of the New York Electrical Society, Mr. Craft, of the Laboratories, lectured on the Vitaphone and by the Vitaphone. His image appeared on the screen and pointed to the parts of the device, all in operation. Simultaneously his voice came from the loudspeakers and explained what he was showing. Such lectures, easily reproduceable everywhere that Vitaphone apparatus is available, suggest interesting possibilities in education. Great educators can now continue their lectures, every expression and inflection unimpaired long after they have ceased to live.

A few years ago the laboratories began another interesting innovation in education in the form of a series of motion picture films, prepared under the direction of John Mills and illustrating the behavior of the invisible sound waves and electrons and oscillating electric currents which play so large a part in the telephone art. Most humans are eye-minded. We understand what we can see far better than what we merely are told. There is enormous difficulty, therefore, in explaining to apprentices in factories or to students in the schools the actions of such hopelessly invisible things as the electrons in a vacuum tube. Direct photography is equally impossible. There is nothing to photograph. Mr. Mills and his associates solved the problem by taking from the theatrical movie the idea of the animated cartoon. Moving drawings illustrate the electrons, the sound waves, and the rest, making these far more vivid than has ever been accomplished in any other way.

Other projects of the laboratories have dealt with magnetism, for the telephone is a magnetic instrument as well as an electric and an acoustic one. Until recently the force of magnetism ranked with gravitation as one of the physical mysteries. No one knew what magnetism really is. The fact that we are now in somewhat better case is not entirely the doing of the



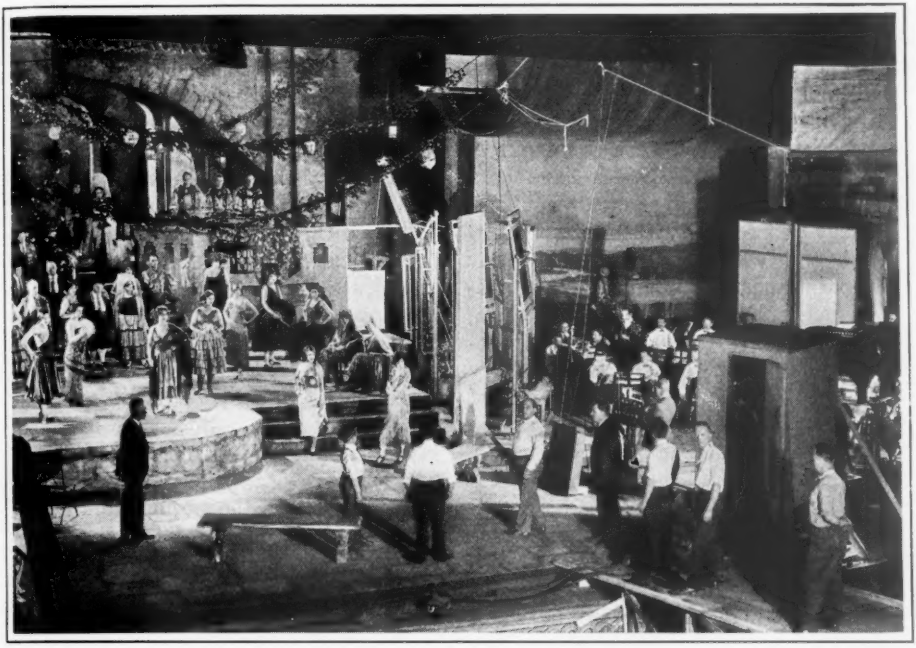
A PART OF THE VITAPHONE RECORDING EQUIPMENT

The theatrical scene opposite, first picked up by microphones, is transmitted to the complex amplifying equipment on the panels shown above and a sound record made on a wax disc. The operator is watching through a powerful microscope the cutting of the record.

Bell Laboratories engineers, but they have had a hand in it. The first step was one of those inevitable exceptions that are supposed to prove the rule; it was not so much the result of the laboratories' chosen method of group research as an empirical discovery, made without benefit of science and indeed in virtual contradiction to what were then believed to be the magnetic laws.

In 1921 Gustaf Waldemar Elmen was testing alloys of iron and other metals, hunting for some alloy that would have greatly better magnetic properties than any alloy then known. This was commonly supposed to be a useless quest. Theory asserted that no material was likely to be much more permeable to magnetism than is iron. Nevertheless, Mr. Elmen, content to ignore the theory, actually discovered a material scores of times more permeable, the alloy of nickel and iron now named permalloy and used to quicken the speed of submarine telegraphic cables. It is pleasant to record that Mr. Elmen's discovery has just been honored by the award of the John Scott Medal, one of the honors most highly prized by engineers, in a previous year awarded to another laboratories engineer, Mr. Housekeeper.

Once made, Mr. Elmen's discovery of an impossible substance had to be explained. Now came the opportunity for coöperative research, and Dr. L. W. McKeehan, also of the laboratories, took the lead in this explanation. It hinges, he found, upon the tiny atoms which compose all materials. When iron is magnetized many of the little iron atoms inside it are compelled to turn around as do the soldiers in a regiment when the order is "about-face." In so doing the atoms joggle against each other. This impedes them. In permalloy, however, the presence of atoms of nickel mixed with the atoms of iron enables both kinds of atoms to turn more easily, the projections on one kind of atom fitting in, so to speak, between the projections on the other kind.



A CHORAL SCENE BEING REPRODUCED FOR THE VITAPHONE

The motion picture camera is in the booth at the right. The voices and music are caught by overhead microphones, hidden from the camera, and carried to the sound-recording apparatus in another part of the studio in a sound-proof room.

The atomic mixture of iron and nickel does an about-face more easily than either kind of atom could do alone.

Among all the thousands of inventions and discoveries which have bestarred so plentifully the record of the Bell telephone organization nothing is more spectacular than the one recently described in the laboratories' own magazine as "the mechanical brain." This is the remarkable assemblage of the machines which operate the automatic telephone exchanges now being installed in the larger cities. No Frankenstein or Robot imagined by writers of fiction excells in competence this marvelous mechanical reality.

The only part of this apparatus which the subscriber sees is the dial which he rotates to call his number. This is merely the ear of the mechanical brain. Built up, ceiling high, in the rooms of the telephone central are the real gray cells of the mechanism. In the laboratories in New York a group of these "brains" are installed as samples and for test. The machines not only remember the number that you have asked for and repeat it, over the proper trunk line, to the central station with which you are to be connected; they also keep a record of the number of calls that you make each day; they sort out pay-station calls from other calls; they will return your coin if the connection is not made; they even call loudly for help when injured or unwell.

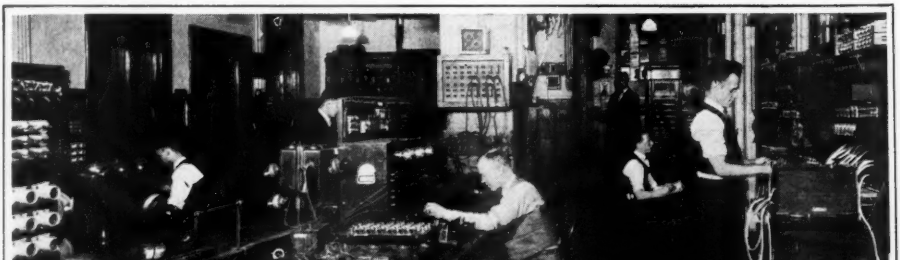
The social implications of this really terrifying monster are enormous. The world tends to reduce human labor. More and more of our work is done for us by machines. If it be true, as Samuel Butler so caustically warned us, that machines are apt to become our masters, not our slaves, it is equally true that they have freed us from the tyranny of labor and in a measure from the Procrustean bed of time. Leisure, for any one except a slave owner, is a creation of machines.

The one point at which our increasingly

mechanical civilization continues to need the human hand is at the throttle. Few machines can control themselves or can think quickly in emergencies. The automatic telephone is one of several signs that our mechanical servants are escaping from these limitations. Machines have been devised which turn out screws by millions, feeding themselves with the necessary metal and ejecting automatically any screws that chance to be ill formed. Another machine makes cigars, wraps them, counts out a box full, stamps it with number and date, and will even write "Merry Christmas" on the outside. But none of these excell in interest the floor of the laboratories' building in New York, where are caged a herd of the new mechanical brains under test as substitutes for operators. Perhaps our brains are merely machines; perhaps machinery, as Butler predicted, is actually acquiring a brain; in either case there promises to be small difference in a century or two between the quality of human thinking and of that which these mechanical marvels can do.

These are a few of the achievements of Bell Telephone Laboratories in the past. It would be even more interesting, I am sure, to discuss some of the researches which are now in progress or which are planned for the future. But it is a canon of scientific good taste not to predict what you are going to discover or to announce an idea before its truth is proved. Real and truthful science is full of surprises. The scientist who predicts little of what he is about to prove will have little to recall when the proof leads to something unexpected. I am not permitted by the scientists of the laboratories to let this article deal with their hopes. Such things are best told of only when they have materialized.

There is an inertia of motion, as well as of rest. The laboratories have grown so accustomed to doing brilliant scientific work that I suspect they have forgotten how to stop. Their important assets are not, it seems to me, the great building in New York City or the incomparable equipment which it contains. The chief asset is not even the staff, able and devoted as it is. What bulks largest is that intangible thing we call a state of mind. The laboratories are in a state of mind to work well together for scientific ends. They have demonstrated a successful coöperative method in a field where coöperation is admittedly rare and difficult. That, let me repeat, is probably what future historians will point to as the one thing for which the institution most deserves to be remembered.



DEVELOPING NEW TELEPHONE CIRCUITS

A division of the Bell Telephone Laboratories devoted to experimental work. Every detail of telephony is intensively investigated in rooms such as the one shown in the picture above.

How Far Can Ford Go?

High Wages, Low Prices, and Mass Production as a Way to Prosperity

WILLIAM TRUFANT FOSTER AND WADDILL CATCHINGS

This is the last of a series of six articles which began in the September number of the WORLD'S WORK. *For the best discussion of the series, of not more than 5,000 words, received by the* WORLD'S WORK *on or before March 31, 1927, the editors of the* WORLD'S WORK *will give an honorarium of $1,000. The six articles in this series, with others by Mr. Foster and Mr. Catchings, will be published shortly by the Pollak Foundation in a book called "Business Without a Buyer."*

ON JANUARY 12, 1914, Henry Ford made the startling announcement that he would henceforth pay a minimum wage of $5 for an eight-hour day. Since that time, the world has moved so rapidly that it is difficult to remember with what predictions of disaster the news was received. Recently he has startled the world again with his announcement of a five-day week. The key to sustained prosperity, he insists, is high wages, low prices, and mass production—with plenty of leisure thrown in. It is not involuntary leisure that he advocates; yet this winter he has shut down his plants at Highland Park and River Rouge and thrown an army out of work. We may well ask, How far can the Ford policies go toward keeping the country prosperous?

These policies, startling enough in themselves, are much more so when adopted by the most conspicuous genius in the industrial world, the most successful business man of our times. No individual ever made so large a personal fortune solely by rendering service—by doing more than holding natural resources and watching them grow in value. Indeed, since the evidence of his service to mankind is rolling along on every highway, the people nowhere seem to resent the fact that he has taken from them, in prices, hundreds of millions of dollars more than he has paid them in wages. Even the fundamentalists have not denounced him for his new commandment: "Five days shalt thou labor and do all thy work."

The unprecedented standard of living which the people of the United States enjoy to-day—the fact that the average wage-earner can buy a car and pay for it, and take his family out for pleasure trips, and have enough money left to buy fully as much of other things as he could buy before the automobile was invented—is due largely (as we explained in the December issue of the WORLD'S WORK) to the development of the automobile industry. We do not all ride in motor cars because we are prosperous; it is more to the point to say that we are prosperous because we all ride in motor cars. And Henry Ford has done more than any other man to make it possible.

To him, therefore, literally millions of people owe much of the gains in health, comfort, leisure, and peace of mind, which have come to them as by-products of the automobile industry. In fact, it is doubtful whether any other man has done as much to make this present era so prosperous.

Within the important field of his own knowledge and experience, Mr. Ford has shown power of analysis, grasp of fundamentals, capacity for distinguishing what he knows from what he does not know, and contempt for mere opinions wherever scientific measurement is possible. He has, moreover, shown such initiative, vision,

and courage that he has won admiration even from those who did not wish to admire him. In a thousand ways, he has skilfully adapted his own industry to the outside economic world upon which it depends.

It is only wnen he has stepped beyond the field of his own exact knowledge and illuminating experience, and attempted to show how to make over that outside world, that he has really blundered. But we should not let the mistakes which he has made outside his workshop blind us to the truths which he has wrought on his own anvil. If he has fallen into error, in his fear that the Jews may acquire control of the world, in his naïve conception of the "Money Power," in his effort to abolish interest charges, in his condemnation of the gold standard, in his proposal to substitute an unworkable system of "commodity money," and in other absurd theories which he has set forth in his *Dearborn Independent*—not "The Chronicler of Neglected Truth," but the Neglecter of Chronicled Truth; if, in such ways, he has taught unsound economics, he seems to have done little harm thereby, for he has taught only in words; whereas he has done much good by teaching *sound* economics in actual practice.

Certainly he has helped by practicing the policy of high wages, low prices, and mass production. To be sure, he has not made wages so high, or prices so low, as he might have made them. That is evident from the fact that his prices have been enough higher than his wages to enable him to realize larger profits thar any other manufacturer ever realized on anything. Nevertheless, he has had a large part in changing the attitude of the business world toward wages. Formerly, employers were always talking about the necessity for reducing wages; now they talk about the necessity for reducing unit costs—not wages. Mr. Ford has helped them to see that it is bad business to destroy customers by reducing their purchasing power.

There is no doubt that business men know more about the relation of consumer income to their own success than they knew in 1921. At that time, in the midst of depression, they were determined to make matters worse by deflating wages in general. Fortunately, their program was successfully resisted by labor. Reduction of the general level of wages, as Mr. Ford has always insisted, is not a cure for hard times. On the contrary, it does more than anything else to prolong hard times. Mr. Ford is right: "The best wages that have up-to-date ever been paid are not nearly as high as they ought to be." Employers, in their own interests, should pay as high wages as they can pay, and still expand their business on a sound basis.

© Harris & Ewing

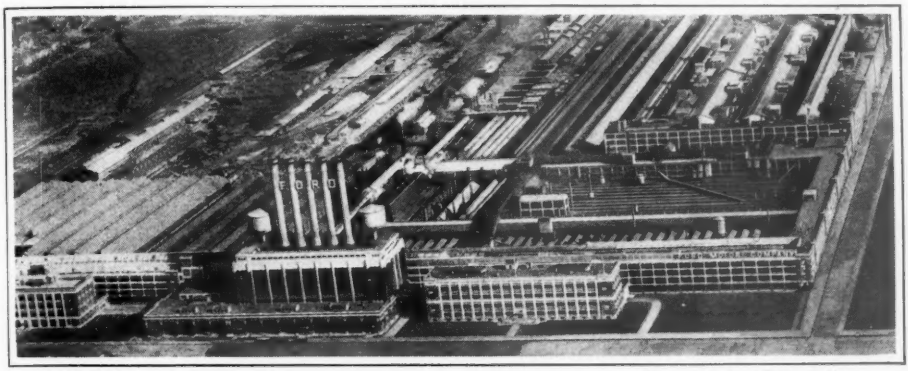
HENRY FORD

It is doubtful if any other man has done as much to make this present era one of prosperity.

But is it possible to pay higher wages? Usually it is. By clear precept and by dramatic example, Mr. Ford has helped us to see how to pay higher wages, by reducing other costs of production. In particular, he has shown how higher wages are made possible by enabling each worker to turn out more work per dollar of wages, through production in large quantities, which in turn is made possible by reduced selling prices. By

resisting every influence brought to bear upon him to increase the unit cost of making cars, by repeatedly increasing wages and reducing prices, he has taught the world its best-known and most convincing lesson in mass production.

No doubt his policies can be carried much further. Various industries, to be sure, are hampered by difficulties with



Photograph from Ewing Galloway

FORD'S HIGHLAND PARK PLANT

When affairs are prosperous, says Henry Ford, the majority are so interested in getting the utmost out of the machine that they will give no time to improving it as it runs.

which the automobile industry does not contend—cotton manufacturing in New England, for example. It is difficult to see how Mr. Ford, during the past fifteen years, could have paid $5 a day to cotton mill operatives in New England, increased the output 500 per cent., and sold the cloth at a price which would have covered even the wages. It is difficult to see how he could have increased the output of leather 500 per cent. by any method whatever; or how he could have sold the leather, if he could have made it. Many other industries have troubles of their own which limit the extent to which they could profit by Ford policies. But even these industries would no doubt gain by a more courageous use of the high-wage, low-price, mass-production program. Certainly, that program has gone far toward enabling consumers to buy the products of industry, and thus to keep industry prosperous. Certainly, that program can go further.

But can it go far enough? Mr. Ford insists that it can. Over and over again, he says that producers need do nothing more, in order to create a full market for their increased output, than to pay high wages and reduce prices. Again and again he leaves the impression that the reason why the whole world does not become prosperous, and stay prosperous, is because—hampered by the "Money Power"—it cannot or will not adopt Ford policies.

Mr. Ford is mistaken. It is impossible for manufacturers to make wages high enough or prices low enough to enable consumers to buy their products. It would be impossible even if every industry in the country gained the full benefits of all the Ford policies, including the financing of expansion without resort to the banks and the "Money Power." High wages and low prices cannot go far enough.

How can they? Even Mr. Ford, with all his pride—his just pride—in the high wages he pays and the low prices he charges, has not for a single year paid enough wages to enable consumers to buy his cars; and in that statement, we include all the wages which he has paid, indirectly, to the workers who have supplied him with materials, and every dollar he has paid for every kind of a cost. The total is less than he receives for his cars. Otherwise there would be no profits, and therefore, no cars.

The point that Mr. Ford has overlooked is this: Business activity cannot move to

higher levels unless prices move to levels higher than all costs of production, including wages. No matter how high the plunger may push the floor of the elevator, it pushes the ceiling higher still. Wages and prices, like the floor and the ceiling of the elevator, move together, one always above the other—as long as business prospers, as long as the elevator works. The wages paid for producing the goods cannot catch up with the prices of the goods, any more than the floor of the elevator can catch up with the ceiling. That is why high wages, alone, cannot solve the problem.

There is a margin between the selling price of the product and the wages which are paid in producing the product. Within that margin are included all the costs, other than wages, and all the profits. It is true that any employer can put up his wages to the extent that he can do so out of that margin. Thus, under certain conditions, he can add to wages what he saves by reducing other costs. Under other conditions he can reduce profits, and to that extent increase wages. But it is equally plain that there is a limit beyond which he cannot go; for he cannot allow wages to absorb the entire margin, without becoming bankrupt. Using to the utmost every means within his power, he cannot push total wages up as high as total selling prices. Some margin must remain. That margin is the measure of the extent to which high wages fail and always must fail to solve the problem of adequate consumer purchasing power.

Sam Witham explained all that one night so that his corner-store forum understood it perfectly.

"You see," he said, "it is this way. I am hiring you, Nathan, and your brother, Ted, to make maple syrup in my wood-lot, up the river road. Now, I have to pay you $4 a day to get you to do the work, and I'd be glad to pay you more. But no matter how much I paid you, I'd have to get more than that for the syrup, or I couldn't keep on hiring you."

"Clear enough," said Nathan.

"Well, then," continued Sam, "if I pay you $2 in wages for every gallon you make, I must sell every gallon you make for more than $2. If I pay you $3, I must get more than $3. And that's the case with every other man who makes anything for sale. So all of them put together, no

FORD ENGINES IN THE MAKING

Reduction of the general level of wages is not a cure for hard times but, on the contrary, does most to prolong them. The Ford prosperity recipe is high wages, low prices, and mass production.

FOUR WELL-KNOWN FORDS

One of Henry Ford's most prized possessions is the first Ford car. His son, Edsel, is seen examining the ten millionth automobile bearing their famous name. The fifteen million mark was reached not long ago.

matter how high wages they pay, are obliged to get back for what they make, more than they pay people for making it."

"Plain as the wart on Cy Plummer's nose," answered Nathan. "But what about this mass production that Henry Ford is talking about? Jest suppose you bought the wood-lots all the way to Hayden's Corner, and hired more men, and gave us a Ford truck instead of old Dobbin, and made a road clear through the woods, so it would be easy to empty the buckets. What then? I reckon you could pay us $5 a day, instead of $4, and sell the stuff for less than you do now, and still make a good profit."

"That may be," answered Sam, "and if I could, it would be good for everybody. But don't you see that I would still have to get more for the stuff than I paid you for making it, or else close out the business? It wouldn't matter how many gallons I sold.

"You recollect how somebody said that Cy Plummer's boy bought soda pop at 6 cts. a bottle, and sold it by the roadside for 5 cts.; and when he was asked how he could make any money doing that, he said, 'Well, you see, it's 'cause I sell so many.'

"Now, what if I did make a lot more syrup, and raise your wages, and put in improvements, and cut the price, and what if I cut my own profit on each gallon to 25 cts. That twenty-five cents would have to come from somewhere, wouldn't it? It wouldn't come from huckleberry bushes, and it wouldn't come from the high wages I paid."

"That sure is a sticker," Nathan admitted. "I'll have to think that over, and see if I can figger out where in heck that twenty-five cents can come from."

While giving Mr. Ford all possible credit for his part in developing the automobile industry, and thus promoting prosperity in general, we must add that the whole development would have been impossible if all producers had followed Mr. Ford's financial policies. That is true because the growth of the industry and of business generally required an expansion of the volume of money in circulation; but Mr. Ford did nothing, directly, to bring about that expansion. He merely took from buyers of Ford cars, and used in enlarging his own business, the money which other men had put into circulation through bank borrowing, and through creating securities which served as a basis for bank borrowing.

That will be clear to any one who bears in mind that Mr. Ford pays out no money except what he receives from consumers, for he does not borrow from the banks and

Photograph from Ewing Galloway

FORDS ON THE FINAL ASSEMBLY LINE

Henry Ford turned the thinking of employers to reduction of unit costs—not wages—and helped them to see that it is bad business to destroy customers by reducing their purchasing power.

he sells no bonds or stocks. In fact, he does not pay out even as much as he receives from consumers, for he accumulates large cash reserves. Plainly, employers as a whole could not follow that policy; for they could not *all* continue to receive from consumers more money than they paid to consumers, when—as is always the case in the United States—consumers have no other source of income.

We are not discussing a theory concerning the expansion of the volume of money. All we are saying is that in the world as it is, money actually has expanded as a part of the process of business expansion; and Mr. Ford has done nothing, directly, to bring about that expansion.

Those who praise the Ford policies sometimes give the impression that the only reason why the country is not far more prosperous is because other employers are too stupid, or too greedy, to adopt the Ford policies. But Mr. Ford himself could not possibly have carried out his own "high wage" and "no bank borrowing" policy if other producers had not carried out an essentially different policy.

"The present monetary system," says Mr. Ford, "tends to block instead of facilitate production." He is right. That is precisely what the present system does—at times.

"We have evolved a system," he continues, "that, instead of being a convenient medium of exchange, is at times a barrier to exchange." Again he is right. Nowhere, however, in his numerous denunciations of our money system—including his proposal to abolish the gold standard and substitute commodity money—has he shown any comprehension of the *way in which* our money system blocks production and the exchange of goods. Nor has he appeared to have any idea how it happens that the very money system which he condemns has enabled him and the country as a whole to prosper so bountifully during the past few years.

Indeed, it seems never to have occurred to him that his own use of the money system, by tending to cause a shortage of consumer income, tends to retard the exchange of goods, and thus to retard the production of goods. The villain in the

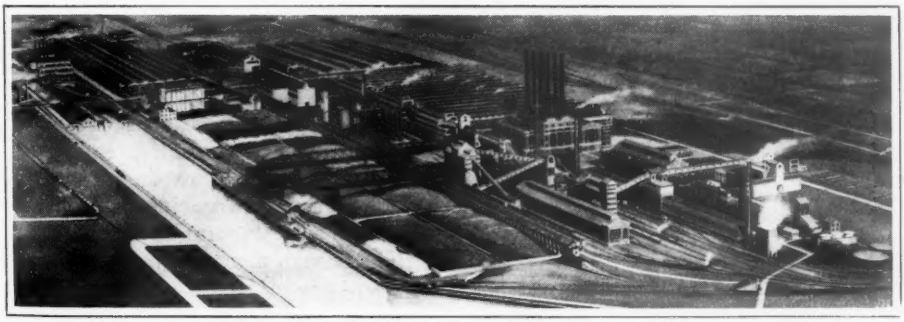
play is always some other actor, usually that shadowy ogre, the "Money Power." There is just as much reason to fear the bogey man; for that ogre is just as real, just as easy to find, just as much of a menace. The real ogre is the deficit of consumer purchasing power. That deficit, which arises in part out of Henry Ford's own method of financing business, is rendered harmless at times by the expansion of bank credit, which takes place in connection with the very methods of financing business which Mr. Ford condemns.

And those methods, we should add, have made Henry Ford's profits possible.

As a substitute for enough money, leisure will not do. We cannot provide business with more buyers by providing workers with more time in which to buy. More leisure they certainly ought to have; but we cannot agree with Mr. Ford in his contention that increased leisure means increased consumption. The fact is that wage-earners as a whole already have plenty of time in which to spend all the money which they have to spend; and there are already plenty of things which they would like to buy. They cannot buy those things with free time. Leisure is not legal tender. Whatever may be said in favor of reducing the hours of labor, it cannot be said that it will increase consumer buying. Workers with a five-day week will consume more goods than workers with a six-day week, if they have larger incomes. Otherwise, they will not.

Mr. Ford is right, however, in his assertion that the way to greater economic progress is *not* the way of greater thrift—innumerable bankers, economists, teachers, and preachers to the contrary notwithstanding. We are speaking of thrift, with the effects which it is allowed to have at the present time. Suppose our thrift campaigns suddenly became much more effective. Suppose all the people saved an additional tithe of their incomes. Suppose exhortations to save suddenly became as effective in persuading people, with money, not to buy as other campaigns have been in persuading people, without money, to buy on installments. There is no doubt what the result would be! Gloom throughout the business world, orders canceled, plants shut down, millions thrown out of work, and all the suffering of another period of hard times.

Fortunately, the natural desire of the people to consume, increased by the urging of the advertisers, and made effective by installment selling, has largely offset the thrift campaigns. Otherwise, our present prosperity would have been impossible. Mr. Ford sees, clearly enough, that there is a Dilemma of Thrift, as far as *individual* savings are concerned. He sees the effect on the sale of Ford cars. The point he does not see is that *corporate* savings are a still larger factor in the dilemma.



Photograph from Ewing Galloway

THE FORDSON PLANT OF THE FORD MOTOR COMPANY

This enormous plant at River Rouge, Michigan, covering 1,100 acres, has its own blast furnaces, coke ovens, foundry, machine shops, body plant, sawmill, glass factory, paper mill, more than a mile of dock frontage, and storage bins for iron ore, coke, and limestone.

Both individuals and corporations *must* save; otherwise there would be no dilemma. Renouncing the ancient virtue of thrift is not the way out. What we must have is a modification of our present system which will enable every one to save as much as he pleases, in ways which best suit his individual interests, without thereby frustrating the social object of thrift. For that purpose, we need a definite, controlled, dependable method of offsetting the deficiencies in consumer buying which at present are caused by savings.

To find the right method, we must subject business to the painstaking study which has been lavished on the Ford car. If business men would give just as rigorous study to that precarious automobile which we call the industrial system; if they would study it now, while it is going fairly well, at rather high speed, in order to find out precisely why it is running better than it used to run, and precisely what kind and quantity of fuel and oil must be fed to the machine, to keep it in good running order, there is no reason why they should not discover how to keep it gliding along, over fairly level roads, hitting on all cylinders, year in and year out.

That thought is one which, from the outset, we have intended to bring into the limelight—if we could produce any limelight—just before the curtain fell. Now we find that Mr. Ford has produced the light and focussed it for us. He says:

> The best time to study our economic machinery is lost because, when affairs are "prospering," the majority are so interested in getting the utmost out of the machine that they will give no time to improving it as it runs. The only time that we stop and seriously look at our economic machinery is when it breaks down. . . . The best way to get a line on the machines is to watch them when they are working at supposedly highest precision.
>
> And that is what we refuse to do. Even our economic observers watch the progress of business mainly to foretell symptoms of breakdown. It is now an established business to keep a lookout for signs of hesitation or collapse, so that those who pay for the lookout may run for cover first. But no one pays for, indeed most resent, service that looks toward prevention of breakdown by attention to the system while it is working full speed. . . .
>
> The responsibility always rests upon those in charge, and they happen to be labelled "conservatives." . . . In the past . . . they have shown their ability to make our crazy-quilt economics yield more square meals and more independence and more homes for more people than has been done anywhere else in the world.
>
> It is clearly up to them now, as trustees, to show what they can do further in the way of making our system fool-proof, malice-proof, and greed-proof for the benefit of every person in the land.

In conclusion, let us say again, what is most needed to attain that end is the right flow of money to consumers. Unless that flow is right, it is *useless* to plead with employers to pay wages high enough to sustain prosperity: they cannot do it. If the flow of money is right, it is *needless* to plead with employers to pay high enough wages: they will do it in order to serve their own interests. The right flow cannot be induced by the high-wage, low-price, mass-production program. The right flow does come at times because, as we explained in our discussion of the automobile industry, there chances to be a sufficient expansion of capital equipment involving a sufficient expansion of the volume of money, to provide the people, in connection with preparation for *future* production, enough money to buy the output of *current* production.

Must the world continue to depend on chance? We do not take that fateful view; we do not believe in the Economics of Despair. We are confident that we can propose a simple, feasible, and immediate way out of the Dilemma of Thrift—a cure for business depressions—a means of enabling the people as a whole to gain greater and more durable satisfactions out of the marvelous machinery of modern business.

THE OTAGO
Conrad's first command

Joseph Conrad's American Notes—and Thoughts on Life

A Final Installment from the Author's Private Letters

References to America and Americans appear throughout Conrad's long correspondence, but he did not visit this country until 1923, though he had sailed to most of the other great lands of the world. Stephen Crane was one of his first staunch American friends—and he respected Jack London, Henry James, Christopher Morley, and H. L. Mencken, among many American writers who were his admirers. This group of letters, taken at random from thirty years of his private correspondence, reveals many of his thoughts of the United States and throws a strong light upon an astonishingly strange philosophy of life. The first letter was written to Elbridge L. Adams, of Boston, while the American trip was being considered.

Oswalds.
Jan. 22nd, 1923

MY DEAR ADAMS,

Your registered article[1] arrived this morning and I put everything aside to welcome it with all the regard and care due to this proof of your solid friendship for us.

I have just read it carefully once and am writing this to (first of all) give you my warm thanks for the pervading sympathy of this sketch of our personal relations. The man who would not be satisfied with it would have to be a very cantankerous, conceited, crooked-minded, and objectionable brute. Seriously, my dear Adams, I am touched by the genuineness of sentiment which informs this survey of our intercourse. I am not alluding here to facts, which are correct but which might have been expressed accurately in many other forms of words, but to that something intangible proceeding from the spirit

[1]An article for *The Outlook* [of America].

DURING HIS AMERICAN VISIT

which makes your form specially welcome to me. . . .

Morley's article[2] is perfectly charming and I cannot but be grateful to him for striking the right note. What is most vexing is to think that after all the thing may not come off, as you know my health is very uncertain, and the months of March and April are a critical time for me in that respect. So the least said about it the better.

I am hard at work at a novel and am feeling fairly well, but the uncertainty of which I have spoken prevents me indulging in hopes. Even my "good" health is a very poor and precarious thing. What frightens me most is the fact that people on your side won't be able to understand how the commonest social exertion may on any given day be too much for me, and take my shrinking for ungraciousness, or laziness, or lack of appreciation, or any other repulsive trait of character. . . .

Conrad refused all academic honors and in the last years of his life declined even a knighthood proffered by the Crown. He was determined to dodge all academic honors in this country as well as in England, as shown by this letter to an American friend:

Oswalds.
March 13th, 1923.

MY DEAR MR. DOUBLEDAY,

. . . I have concluded to start from Glasgow on Ap. 21st. by the *Tuscania*, which David Bone is commanding now. It will make a great difference to me to cross over with a friend. The *Tuscania* will be returning on June 7th, which will give me a clear month (of May) in the United States. It seems an awful long time to inflict myself on the kindness of Mrs. Doubleday and yourself. I hope you will not regret your friendly impulse to make me free of your home for such a long time. . . .

It has occurred to me, dear Mr. Doubleday, that I ought to tell you of the offers I had by the Universities of Oxford, Edinburgh, Liverpool, and Durham, of an honorary degree, which I have declined. I only would like to point out that this would debar me from

[2]Christopher Morley's article on Conrad's forthcoming visit to the United States, which appeared in the *New York Evening Post*.

accepting a similar offer from any other quarter. Refusing such an honor is the most disagreeable thing in the world, but I am perfectly determined to have nothing to do with any academic distinction. . . .

A letter to John Galsworthy about the forthcoming American voyage.

Oswalds.
14 Ap. 1923.

MY DEAREST JACK,

. . . I hope that journey will not turn out a fool's errand. As to sneaking in quietly into the U. S., there is no hope of that. Muirhead Bone is going in the same ship (his brother commands her) and of course James Bone (of the *Man: Guardian*) knows all about it and has been talking. I have had quite a few wires from various papers, already. The fat is in the fire. But you need not be uneasy about the safety of American pressmen. I am going to leave my revolver at home. If I have to show them my teeth (artificial) it will only be in an agreeable smile. And as to what may come after, I leave it to Chance and the inspiration of the moment. I, absolutely, cannot think about it now. Our dear love to you both. It would be a hypocritical affectation on my part to ask you to keep me in your mind. I know you will do that. That is one of the certitudes of my life.

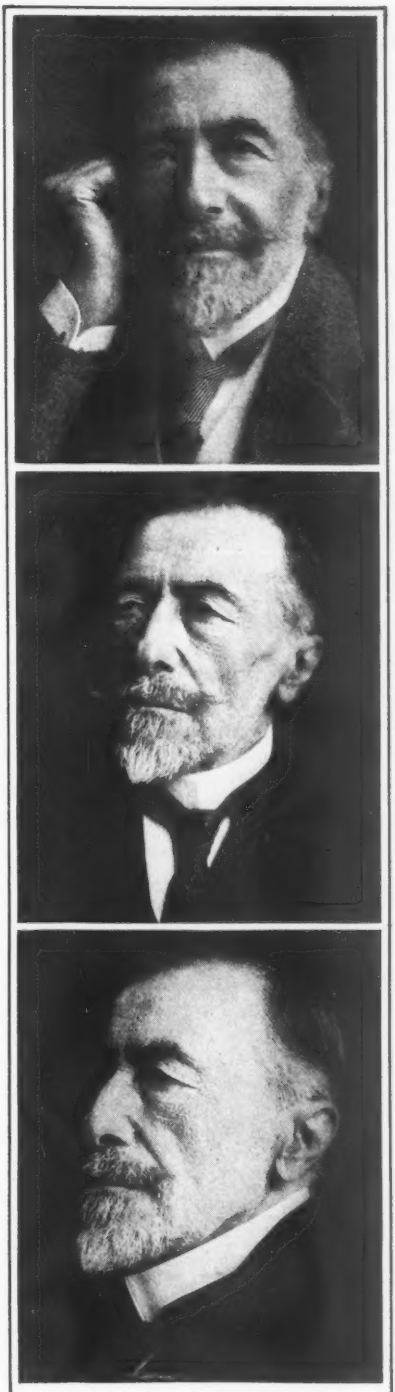
A note to Sir Robert Jones about the trip to the United States.

Hotel Curzon,
Curzon Street,
Mayfair, London, W.
Thursday, 19.4.23.

DEAREST AND BEST OF FRIENDS,

I am so sorry not to see you before I sail. You will forgive me; but the fact is I have been hard at it almost to the last moment doing a special bit of work which is to pay part of the expenses of this trip.

Scribbling has become utterly distasteful to me. As to this voyage, I start on it without enthusiasm, not because I doubt getting a good reception in the U. S. and probably deriving a certain benefit materially from the visit, but



NEVER A DEMONSTRATIVE MAN

simply because I do not feel quite fit for it—in myself. However, everybody tells me that I look very well—so it may be imagination on my part.

It is an immense comfort to me to think that you will see Jessie the day after my departure. I think she will miss me—and I know that I shall feel like a lost sheep without her. I believe there are many people ready to take care of me on the other side, but no number of them could make up for her absence.

He Disliked the Ocean Liner, And Preferred a Sailing Ship

Several months after his return from his American voyage Conrad in this letter to Captain A. W. Phillips told what he thought of the palatial liners which had carried him to and from America.

Oswalds,
Jan. 12th, 1924.

DEAR CAPTAIN PHILLIPS,

. . . I share to the full your sentiments about all kinds of mechanical propulsion. It changed the life entirely, and changed also the character of the (sea) men. There is not much difference now between a deck and a factory hand.

In the early part of last year I crossed to New York with my old friend Capt. David Bone commanding the *Tuscania*. Of course I was made free of the bridge and the navigation room. I won't say I was not interested. I was, in a way, for about 30 hours, till I went twice over all the switches working various gadgets. But I remained cold, completely cold, before all those things which make the position of a ship's officer almost an indoor occupation. It is a fact that one can take a ship along now in white gloves and without, so to speak, opening one's mouth once.

Capt. Bone, who had some ten years of sail, told me that they had wholly lost the "weather sense," that touch with the natural phenomena of wind and sea which was the very breath of our professional life. I was generally in his room when he was interviewing the heads of "departments," and I went also with him on his rounds. Once he made the remark to me that being a shipmaster now was not like being in command of a ship but at the head of an administration. However, he told me also that in certain circumstances those

OSWALDS, BISHOPSBOURNE IN KENT, ENGLAND
A quiet country home, within sight of the spires of Canterbury Cathedral, where Conrad spent the last decade of his life.

WHERE CONRAD ONCE LIVED IN CRACOW

In 1868, Conrad's father, an exiled Polish patriot, too ill to be "dangerous," brought his motherless ten-year-old son to Cracow to go to school.

big ferry boats required careful handling and that no two of them were alike.

I returned in the *Majestic*. As to that, all I can tell you is that on the 6½ days' passage I hardly put my nose once on deck. It was really too dreary. I met the Captain at a tea-party given by a fashionable lady passenger, but only exchanged a few words with him. What I remember best is him telling me that in one way or another the command of a big ship like that was a pretty heavy load on a man's shoulders.

He was fairly mobbed by the American reporters when he arrived in New York, and his threat to "show his teeth" did not save him from being photographed and interviewed wholesale—and here he tells Mrs. Conrad what he thinks about it.

Effendi Hill,
Oyster Bay, Long Island,
New York.
4. 5. 23.

MY DEAREST CHICA,

. . . I will not attempt to describe to you my landing, because it is indescribable. To be aimed at by forty cameras held by forty men is a nerve-shattering experience. Even Doubleday looked exhausted after we had escaped from that mob—and the other mob of journalists.

Then a Polish deputation, men and women (some of these quite pretty), rushed me on the wharf and thrust enormous nosegays into my hands. . . . I went along like a man in a dream and took refuge in D's car.

Imagine, my dear, Powell was there too! Mrs. D. asked him to call, and he dined here yesterday and then played Beethoven and Chopin. Between whiles we talk of you. In fact, you have been very much to the fore in everybody's conversation.

To-morrow, Friday, I go to the Garden City in the morning. In the evening there is a dinner-party for J. W. Davis (late Ambassador to England) and Col. House to meet me. . . . My reception by the press was quite remarkable in its friendliness. . . .

Conrad had innumerable invitations to lecture in the United States, but he declined

A SIMPLE UNAFFECTED HOST

"Oswalds" was a week-end rendezvous for a small group of interesting people including Galsworthy, John Powell, and Cunninghame Graham.

them—and in this letter to Elbridge L. Adams he tells why.

Oswalds.
Nov. 20th, 1922.

MY DEAR ADAMS:

. . . I have had a letter from Mr. Lee Keedick on the subject of the lectures of which you speak. I have directed Eric Pinker to write to him that it is impossible, for the moment, at any rate. And I don't know that, on consideration, it is a thing to be ever done. In your friendly anxiety, my dear Adams, you forget the deplorable state of my voice which has been affected by a severe attack of gout in the throat some years ago. Then, apart from the danger of being faced by "extinction" in the middle of a lecture, I will tell you frankly that I am not very anxious to display my accent before a large gathering of people. It might affect them disagreeably, to my disadvantage. And no man ought to be condemned for shrinking from that kind of risk.

I will disclose to you that this really is the sorrow of my life; for if it were not for that shrinking I would love nothing better than to give readings from my works, for I know I can read expressively and dramatically and with good effect, if it were not for those obstacles to any sort of public appearance. It costs me something to meet the suggestion of such a warm friend as you are by a negative, and I want you to believe that it is not unreasonable shyness or mere obstinacy, but something in the nature of very reasonable caution that causes me to assume that attitude. I don't mention laziness because that was never my failing, and in this particular instance would have had no chance because, God knows, I want the money. And it is not greed either. You must remember, my dear Adams, that success came to me in the material sense only in 1913 after eighteen years of steady writing. I at once devoted myself to paying off old debts and meeting old obligations. This was of course the first duty. Then came the war, checking the normal development of that material prosperity to a great extent and bringing no end of calls upon my earnings, calls the strength of which one could not resist and indeed never thought of resisting. And now the years are creeping on me with absolutely nothing laid by. So the position is serious enough to make me turn to any prospect of making a little money in an honest and dignified manner—as long as my faculties last. For my faculties are the only capital I have.

But he did accept one invitation to lecture, and was exhilarated by the experience, as he tells in this letter to Mrs. Conrad and another to a literary friend.

11 May, 1923. New York.

DARLING OWN JESS,

. . . I feel at this moment (10:30 A. M.) perfectly flat, effect of reaction after last evening—which ended only after midnight—at Mrs. Curtis James's.

I may tell you at once that it was a most brilliant affair, and I would have given anything for you to have been there and seen all that crowd and all that splendor, the very top of the basket of the fashionable and literary circles. All last week there was desperate fighting and plotting in the N. York society to get invitations.

I had the lucky inspiration to refuse to accept any payment; and, my dear, I had a perfect success. I gave a talk and pieces of reading out of "Victory." After the applause from the audience, which stood up when I appeared, had ceased I had a moment of positive anguish. Then I took out the watch you had given me and laid it on the table, made one mighty effort, and began to speak.

That watch was the greatest comfort to me. Something of you. I timed myself by it all along. I began at 9:45 and ended exactly at 11. There was a most attentive silence, some laughs, and at the end, when I read the chapter of Lena's death, audible snuffling. Then handshaking with 200 people. It was a great experience.

On Tuesday we start for a tour towards Boston.

Effendi Hill.
11. 5. 23.

DEAREST DICK,[3]

Am awfully rushed or else lying prostrate to recover—but in either case in no writing mood. But I must drop you a line to say that the evening at Mrs. Curtis James was a most fashionable affair—and, what is more, a real success. I gave a talk and readings from "Victory." One hour and a quarter, with an ovation at the end. They were most attentive. Laughs at proper places and snuffles at the last, when I read the whole chapter of Lena's death. It was a great social function and people fought for invitations. I made it clearly understood from the first that I was not doing this sort of thing for money. This gave my visit to U. S. a particular character, about which the press spoke out. Generally my reception in the papers was wonderful.

[3]Richard Curle.

GREATEST OF SEA WRITERS

In an age that cares nothing for poetry, except in fragments, Conrad succeeded in putting it into voluminous prose.

These two letters, the first to Mrs. Conrad and the second to Elbridge L. Adams, give two of his thoughts of this country—he could not master the postal facilities, but he saw the great rôle of America in world affairs.

New York.
24th May, 1923.

MY VERY OWN DEAR JESS,

. . . Don't imagine, my dearest, that the delights of this country make me forget my home—which is where you are: and, indeed, is nothing to me but you, you alone wherever you may be. Consider, dear, that I am in a strange country on Long Island where I do not know where the nearest P. office is—miles off probably; that the postal arrangements are very primitive, and that I am at the mercy of people around me. The Garden City is 15 miles from here.

During our tour it was just the same and, you know, the hotels have no letter

boxes and I am not the sort of person that can rush out at the last minute and post a letter.

31 May, '23.
Effendi Hill, New York.

MY DEAR ADAMS,

. . . I am going away with a strong impression of American large-heartedness and generosity. I have not for a moment felt like a stranger in this great country, about the future of which no sensible man would dare to speculate. But no sensible man would doubt its significance in the history of mankind. I am proud to have had from it an unexpected warmth of public recognition and the gift of precious private friendships. . . .

Mencken "Makes Me Giddy"

In the next two letters Conrad gives his opinion of such contrasted American writers as H. L. Mencken and Jack London. He was, with reservations, an admirer of Mr. Mencken; he denies being "literarily a sort of Jack London"—and insists that if he had not written in English he would not have written at all.

Oswalds.
December 14th, 1922.

MY DEAR MR. KEATING,

. . . Mencken's vigor is astonishing. It is like an electric current. In all he writes there is a crackle of blue sparks like those one sees in a dynamo house, amongst revolving masses of metal that give you a sense of enormous hidden power. For that is what he has. Dynamic power. When he takes up a man he snatches him away and fashions him into something that (in my case) he is pleased with—luckily for me, because had I not pleased him he would have torn me limb from limb. Whereas, as it is, he exalts me almost above the stars. It makes me giddy.

THE CONRADS AND THEIR YOUNGER SON, JOHN
Conrad's ideal in writing was unattainable, his striving was intense labor, and his mood frequently weary and depressed.

CONRAD NEVER COMPREHENDED THE EXTENT OF HIS FAME

He disliked cities, crowds, noise, and strange people who foolishly attempted to lionize him. He was not an outdoor man, despite his love for the outdoors, and no one ever saw him take exercise.

But who could quarrel with such generosity, such vibrating sympathy, and with a mind so intensely alive. What, however, surprises me is that a personality so genuine in its sensations, so independent in judgment, should now and then condescend to mere parrot talk; for his harping on my Clavonism is only that. I wonder what meaning he attaches to the word. Does he mean by it primitive natures fashioned by a Byzantine theological conception of life, with an inclination to perverted mysticism? Then it cannot possibly apply to me. Racially I belong to a group which has historically a political past, with a Western Roman culture derived at first from Italy and then from France; and a rather Southern temperament; an outpost of Westernism with a Roman tradition situated between Slavo-Tartar Byzantine barbarism on one side and the German tribes on the other; resisting both influences desperately and still remaining true to itself to this very day.

I went out into the world before I was seventeen, to France and England, and in neither country did I feel myself a stranger for a moment: neither as regards ideas, sentiments, or institutions. If he means that I have been influenced by so-called Slavonic literature then he is utterly wrong. I suppose he means Russian; but, as a matter of fact, I never knew Russian. The few novels I have read, I have read in translation. Their mentality and their

emotionalism have been always repugnant to me, hereditarily and individually. Apart from Polish, my youth has been fed on French and English literature. While I was a boy in a great public school, we were steeped in classicism to the lips, and, though our historical studies were naturally tinted with Germanism, I know that all we boys, the six hundred of us, resisted that influence with all our might, while accepting the results of German research and thoroughness. And that was only natural.

I am a child, not of a savage, but of a chivalrous tradition, and if my mind took a tinge from anything it was from French romanticism perhaps. It was fed on ideas, not of revolt but of liberalism of a perfectly disinterested kind, and on severe moral lessons of national misfortune. Of course I broke away early. Excess of individualism perhaps? But that, and other things, I have settled a long time ago with my conscience. I admit I was never an average, able boy. As a matter of fact, I was not able at all. In whatever I have achieved afterwards I have simply followed my instinct; the voice from outside. Mencken might have given me the credit of being just an individual somewhat out of the common, instead of ramming me into a category, which proceeding, anyhow, is an exploded superstition.

This outburst is provoked, of course, by dear Mencken's amazing article about me, so many-sided, so brilliant, and so warm-hearted. For that man of a really ruthless mind, pitiless to all shams and common formulas, has a great generosity. My debt of gratitude to him has been growing for years, and I am glad I have lived long enough to read the latest contribution. It's enough to scare any one into the most self-searching mood. It is difficult to believe that one has deserved all that. So that is how I appear to L. Mencken! Well, so be it! What more could any one expect?

Oswalds.
7th March, 1923.

DEAR DR. BENDZ,[4]

Thank you very much for the copy of the pamphlet on myself and my work. I need not tell you I have perused it with great attention and no small appreciation.

I have the more reason to be grateful to you for this remarkable, and in so many ways generous, recognition of my work, because I have heard, from a friend who visited Sweden last year, that I am regarded in that country as literarily a sort of Jack London. I don't mean to depreciate in the least the talent of the late Jack London, who wrote to me in a most friendly way many years ago, at the very beginning, I think, of his literary career, and with whom I used to exchange messages through friends afterwards; but the fact remains that temperamentally, mentally, and as a prose writer, I am a different person. I sympathized much with the warm and direct talent of Jack London, and was sorry to hear of his death—but, after all, one doesn't like to be taken for what one is not. For one thing, for instance, I am much less of a good humanitarian than Jack London; but I think that I am not taking too much on myself in saying that I am a good European, not exactly in the superficial, cosmopolitan sense, but in the blood and bone as it were, and as the result of a long heredity. . . .

It is very obvious that I don't possess the English language in any exceptional way; but that is no reason to doubt my sincerity when I say that it has possessed and even shaped my thoughts. Idiomatically I am never at fault, and it is absolutely true that if I had not written in English I would not have written at all.

[4]Ernst Bendz.

THE WORKSHOP

THE IMMEDIATE and favorable response of the readers of the WORLD'S WORK to the new all-illustrated magazine, which began with our last issue, was most encouraging to those who toil in this Workshop. Planning for the change and the work of making the transition was arduous, but we feel fully repaid for our efforts if our readers are pleased, for, after all, no matter what the labor or the mental anxiety, our job is not only to inform but also to please and entertain our readers. This is not our magazine, but the readers' magazine. It is not edited for ourselves—though we take professional pride in our work—but it is edited for readers. The final signal of approbation must come from them.

We are pleased to start in this issue the story of COLONEL THOMAS E. LAWRENCE who is, without doubt, the greatest living adventurer and one of the most remarkable figures of all history. We read with bated breath of the exploits of great knights and crusaders of olden times. Here is a diminutive, shy young man who has equalled them all in daring, in courage, and in accomplishment. Over this ancient land, where he played such a great rôle not only in the liberation of Arabia but also in the Great War as it was affected by operations in the Near East, have passed Crusaders, Roman conquerors, and another young man to whom he might be compared in daring—the immortal Alexander. Strong words, but true! Of this great narrative of Colonel Lawrence, a recent cable dispatch from London to *The New York Times* said:

> The book relating the extraordinary adventures of an extraordinary man, Colonel Thomas E. Lawrence of Arabia, has at last been published. While awaited eagerly by two continents for six years, the book is now in the hands of only a few friends of Colonel Lawrence, who subscribed thirty guineas (about $156) per copy for it. No review copies have been sent to the newspapers, but the book is described in *The London Times* by D. G. Hogarth, the author of "The Penetration of Arabia."
>
> Colonel Lawrence first wrote the book in Emir Feisal's temporary home in Paris after both had withdrawn embittered from the Paris Peace Conference, because of its failure to modify the French plan for a mandate over Syria. After finishing the book, in which he tells the story of how he caused and led the Arab revolt against the Turks upon the promise of the Arab autonomy which the French refused to allow the Arabs wholly to realize, he returned to England. Leaving his satchel containing his manuscript notes and many illustrations unguarded for a moment at Reading railway station, it was stolen and was never recovered. For a time it was thought that the manuscript had been stolen for some definite purpose at the behest of persons interested, but it is now assumed that it was taken by a sneak thief.
>
> Colonel Lawrence then rewrote his narrative in 400,000 words and had eight copies printed, of which four or possibly five remain. Twice he was induced to publish the book for wider circulation, but he backed out each time.
>
> Finally, he consented to publish the present edition on the persuasion of the late Gertrude Bell of Arabian fame. Colonel Lawrence wished but few eyes to read his book, for a reason, so Hogarth says, apparent to those who obtained copies of the limited edition.
>
> The book is said to be a marvel of typography and illustration. Under a subtitle "An Arabian Epic," *The London Times* says of Lawrence's adventures:
>
> "Of all the campaigns of war, none has been stranger or more picturesque than the struggle between a small group of Riffian leaders, with their fickle and uncertain tribal levies, and the armies of the Turk."

The most spectacular feat of Colonel Lawrence described in his book is his ride through enemy territory to stir up the tribesmen in Wadi-Sirhan and the capture of Akaba, which set the Arabs free of Turkish rule.

Another exciting incident is when Colonel Lawrence was almost killed when leading a camel charge against the Turks. He was saved from death by the body of his fallen camel. He also describes his adventures in wrecking railway trains, which earned for him the title among the Arabs of "Wrecker of Engines."

The first of the two incidents mentioned in the last paragraph of the foregoing dispatch is described by Colonel Lawrence in the installment in this issue.

We believe that presentation of Colonel Lawrence's book as a serial in the WORLD'S WORK is an event in magazine publishing, for as this great tale unfolds our readers will realize that it is literature and true adventure of the most vivid kind.

March being a month of misery not only because it is the last of winter but because it is the time when we have to make up our income tax statements, we hope to present in our March issue a few articles telling what future miseries taxation has in store for us. In our series on "These New United States" we will tell the story of the development of Birmingham. We will, of course, have the second installment from Colonel LAWRENCE's brilliant book. A remarkable interview with GERARD SWOPE, president of the General Electric Company, by Mr. STROTHER, also will appear as a link in our series on "The New Leadership of Big Business." And, as a new offering, we will have an article in a new series on crime and criminals by LAWRENCE VEILLER, whose remarkable series entitled "The Rising Tide of Crime," just a year ago, was hailed as the outstanding contribution to the discussion of a grave national problem. And there will be other good articles.

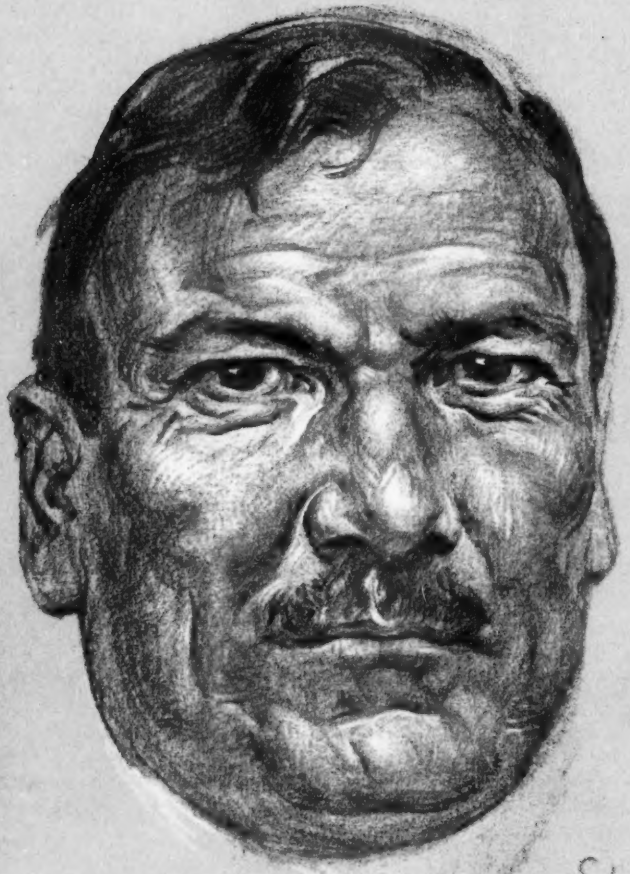
Aërial surveying has become one of the picturesque and necessary duties of the world's work, and the article by Lieutenant B. H. WYATT, U. S. N., presents in able style the accomplishments of the Navy expedition which went to Alaska last summer to map "our last frontier." The Secretary of the Interior pointed out that this expedition in a few months had done work that could not have been done by a land expedition in less than ten years. Before he started on this work, Lieutenant Wyatt had mapped other areas in the Western part of this country.

The article on Henry Ford in this issue completes the series by WILLIAM T. FOSTER and WADDILL CATCHINGS, who have set forth their theory of the consumers' influence upon prosperity. For the information of those readers who intend to compete for the prize of $1,000 offered in connection with this series we reprint the following information:

The bearing of the main argument of "Profits" on some of the dominant political problems of to-day is set forth, by William Trufant Foster and Waddill Catchings, in six articles in the WORLD'S WORK, September, 1926, to February, 1927. The editors, believing that this series will cause widespread discussion, and hoping that the best of that discussion may be preserved, offer $1,000 for the article of 5,000 words which, in the opinion of the editors, best discusses the series. This contest is not limited to *adverse* criticism. To be considered, articles must be received by the WORLD'S WORK on or before March 31, 1927. The editors will be glad to answer questions concerning their contest.

E. E. FREE, who writes the article on the Western Electric laboratories, is one of our best known scientific writers and was formerly editor of *The Scientific American*. He is a consulting engineer by profession. SAMUEL O. DUNN, author of the article on the railroads, is editor of *The Railway Age*.

In view of the fact that LOWELL THOMAS'S introduction to Colonel Lawrence's narrative in this issue is largely personality, we omit our Personalities department for this issue only, using the space for the brief article about Lawrence of Arabia.



President Calles of Mexico

A Drawing by Oscar Cesare